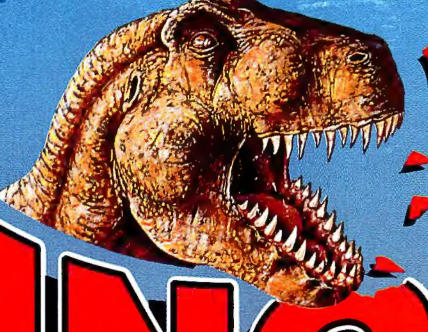
Morrison



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**DINOSAURS! is published by
Orbis Publishing Ltd
Griffin House
161 Hammersmith Rd
London W6 8SD**

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**EDITORIAL & DESIGN by
Tucker Slingsby
3G London House
66-68 Upper Richmond Rd
London SW15 2RP**

**N74 94 09 01
ISBN 0 7489 1674 1**

**Printed in Italy by Officine Grafiche
De Agostini, Novara**

BRONTOTHERIUM

***Brontotherium* was a massive plant-eater, bigger than the rhinoceroses of today.**

As the huge, warm forests of Eocene times gave way to the more open plains of the Oligocene, new mammals arrived to fill the landscape. *Brontotherium* lived side by side with the earliest horses and camels, but stood head and shoulders above most of its neighbours.

SOFT LEAVES

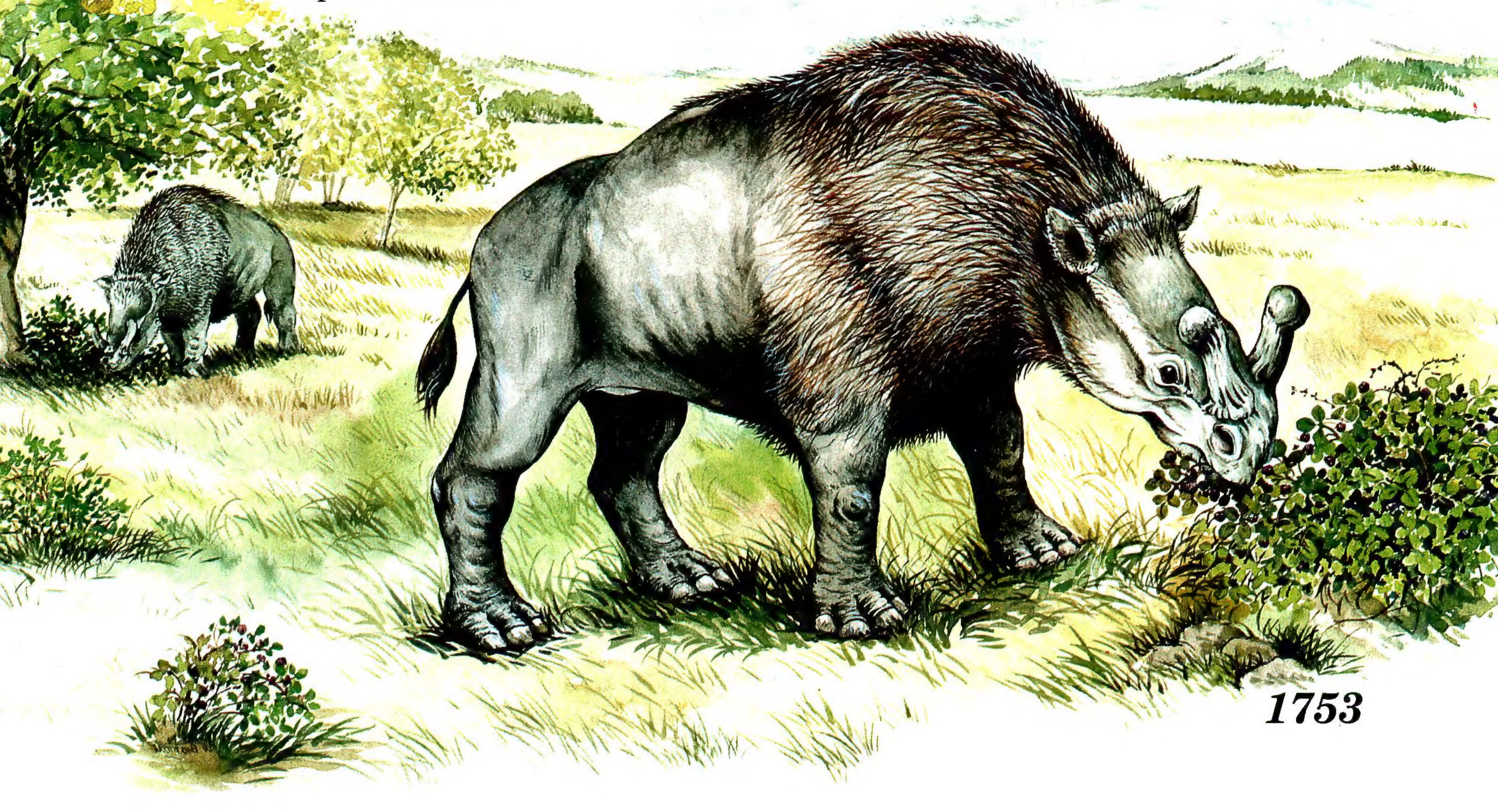
Brontotherium needed lots of food to fill its large body. It browsed on soft leaves and crushed them with big, square back teeth. As its teeth had to work hard – just like yours do – to provide a constant supply of food, the teeth were covered with a layer of hard enamel to protect them.

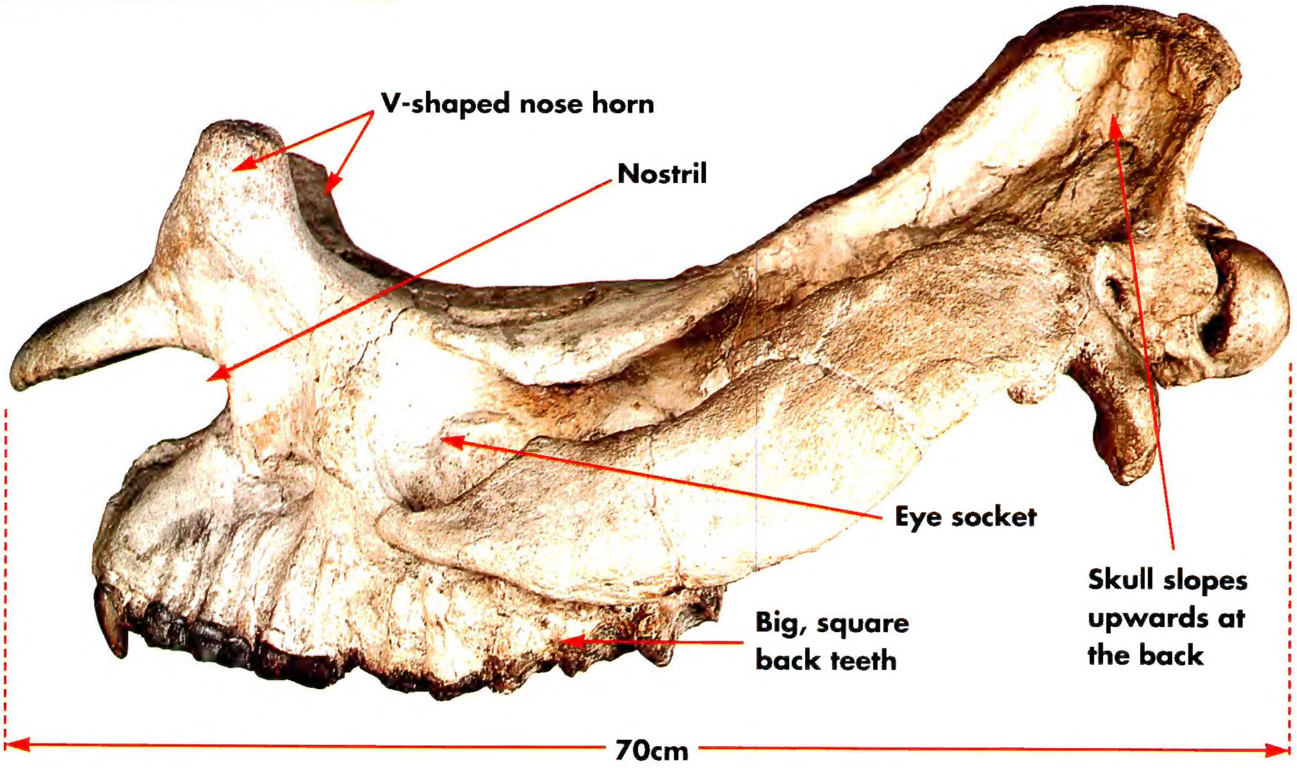
ODD TOES

Brontotherium's bulky body was supported by four sturdy legs and short, wide feet. Its front feet were tipped by four hoofed toes, but there were only three toes on each of its hind feet. The toes spread out like little platforms to support the animal's weight and give *Brontotherium* good balance as it plodded along.

RUMBLE OF THUNDER

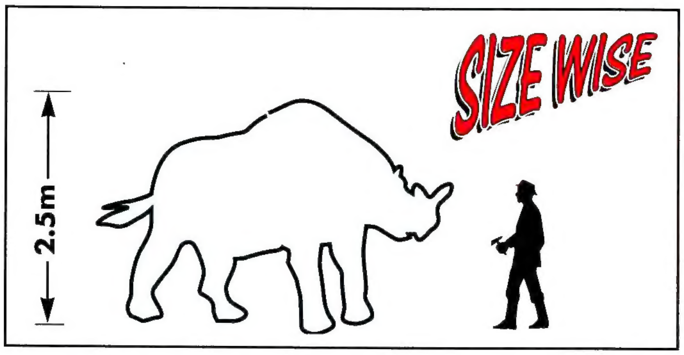
If it was frightened, *Brontotherium* probably broke into a slow run. Imagine a herd of these huge animals rumbling across a plain with the earth shaking beneath them. It is no wonder that *Brontotherium* means 'thunder beast'!





CATAPULT NOSE

Brontotherium looked just as if it had a catapult at the end of its nose. This V-shaped horn was bigger in males than in females, so experts think that males probably used them to fight for females.



MONSTER FACTS

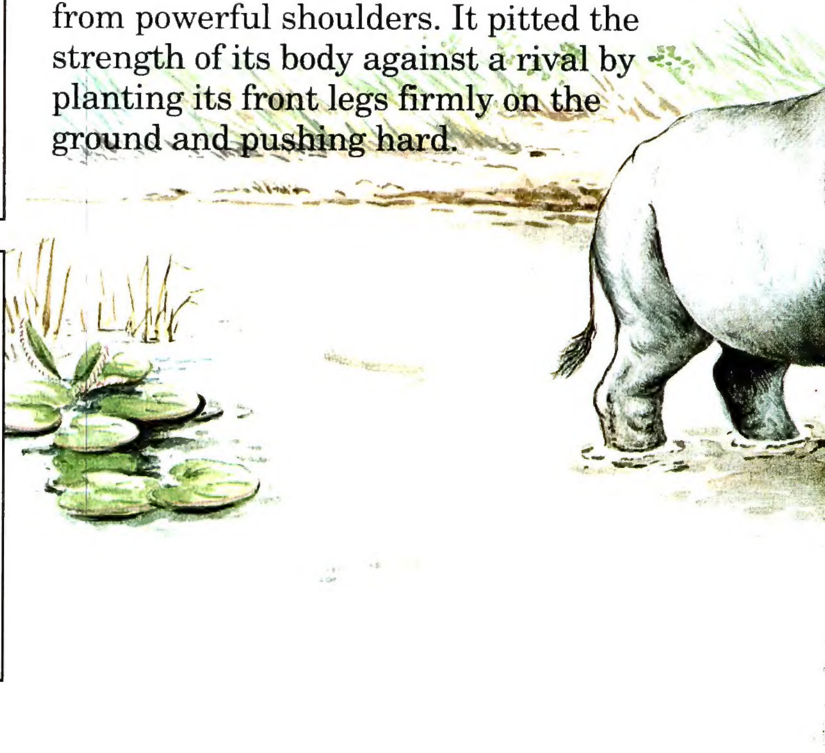
- **NAME:** *Brontotherium* (bron-toe-thee-ree-um) means 'thunder beast'
- **GROUP:** mammal
- **SIZE:** 2.5m tall at shoulder
- **FOOD:** soft leaves
- **LIVED:** 30 million years ago in the Oligocene Epoch in South Dakota, USA

HEAD TO HEAD

Rival males fought to gain control of a herd or to win first choice of a mate. Two males locked their strange horns and wrestled from side to side until one of them gave up. Or they may have banged heads to find out who was the champion.

STRONG SHOULDERS

Brontotherium's heavy body sloped down from powerful shoulders. It pitted the strength of its body against a rival by planting its front legs firmly on the ground and pushing hard.



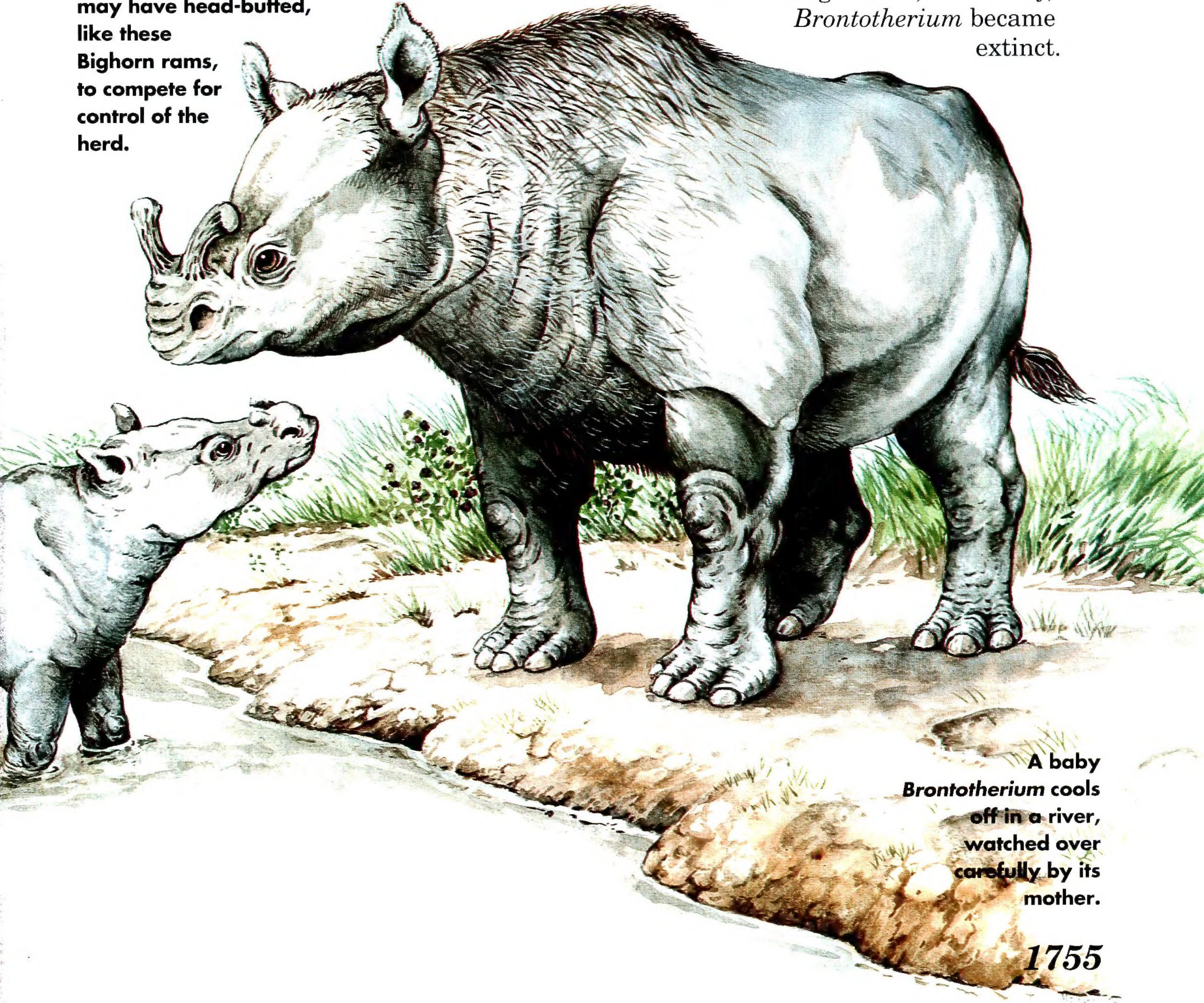
Male *Brontotherium* may have head-butted, like these Bighorn rams, to compete for control of the herd.

Is it true that *Brontotherium* was related to the horse?

Yes. *Brontotherium* belonged to the same group of hoofed mammals as horses. They were descended from condylarths, which lived 40-65 million years ago.

TOO TOUGH

As grasslands spread across North America, *Brontotherium* found it harder to find food. The new grasses were tough and hard to digest and, eventually, *Brontotherium* became extinct.



A baby *Brontotherium* cools off in a river, watched over carefully by its mother.

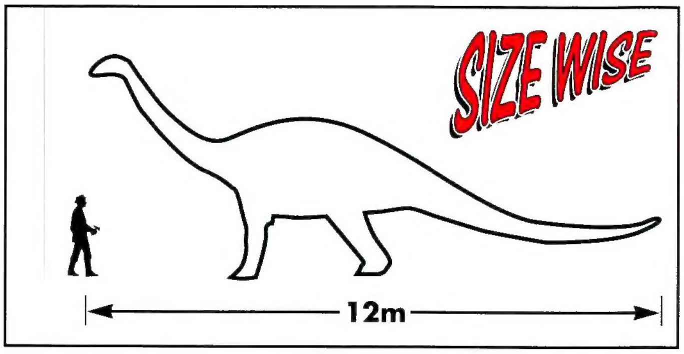
HYPSELOSAURUS

Giant fossil eggs were found close to the remains of *Hypselosaurus*.

Near *Hypselosaurus*' fossilized remains, scientists discovered some amazing eggs and pieces of eggshell. The eggs measured 30cm long and 25cm wide. How did a massive sauropod such as *Hypselosaurus* lay these eggs without squashing them? One suggestion is that the eggs were laid in batches while the dinosaur was moving.

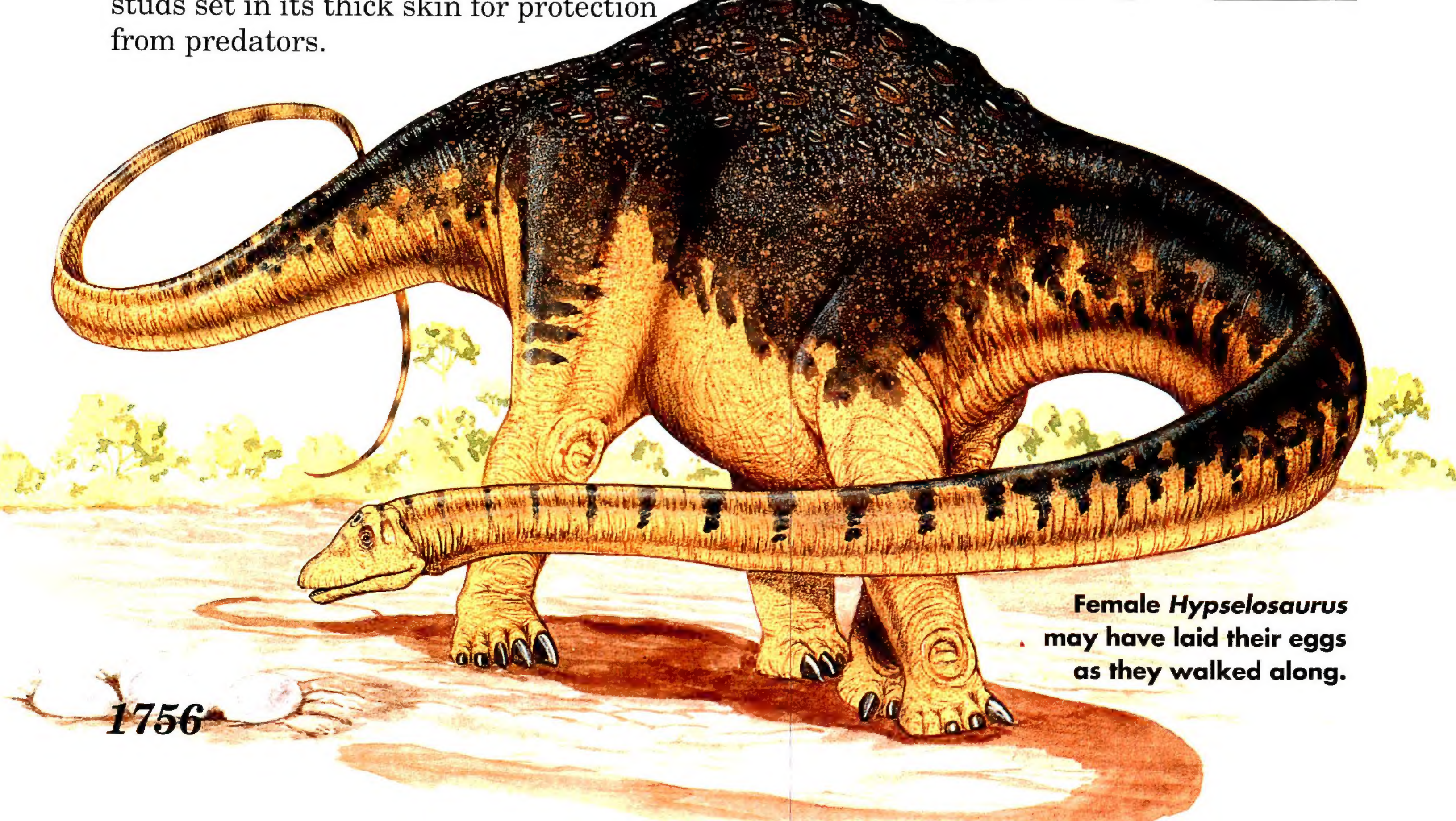
STUDDED PROTECTION

With its long neck and small head, *Hypselosaurus* nosed among the tree tops for its food. It stripped leaves from branches with small, peg-like teeth. Like its relative *Saltasaurus*, *Hypselosaurus* may have had a covering of small bony studs set in its thick skin for protection from predators.



MONSTER FACTS

- **NAME:** *Hypselosaurus* (hip-sel-o-saw-rus) means 'high reptile'
- **GROUP:** dinosaur
- **SIZE:** 12m long
- **FOOD:** plants
- **LIVED:** about 70 million years ago in the Late Cretaceous Period in southern France and northern Spain



Female *Hypselosaurus* may have laid their eggs as they walked along.

NEMEGTOSAURUS

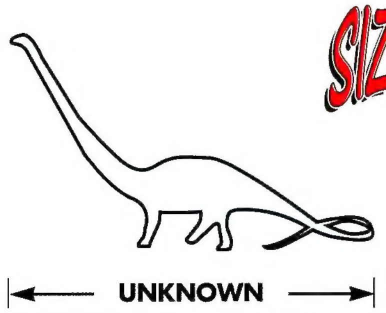
***Nemegtosaurus*' skull was found in the Gobi Desert, Mongolia.**

Nemegtosaurus was named by a Polish palaeontologist after the valley in Mongolia where it was found. *Nemegtosaurus* is a sauropod from the diplodocid family.

LATER RELATIVE

All the diplodocids found before *Nemegtosaurus* had lived in the Jurassic Period. But scientists discovered from its skull that *Nemegtosaurus* lived in Late Cretaceous times, millions of years after its relatives *Diplodocus* and *Apatosaurus*.

SIZE WISE



MONSTER FACTS

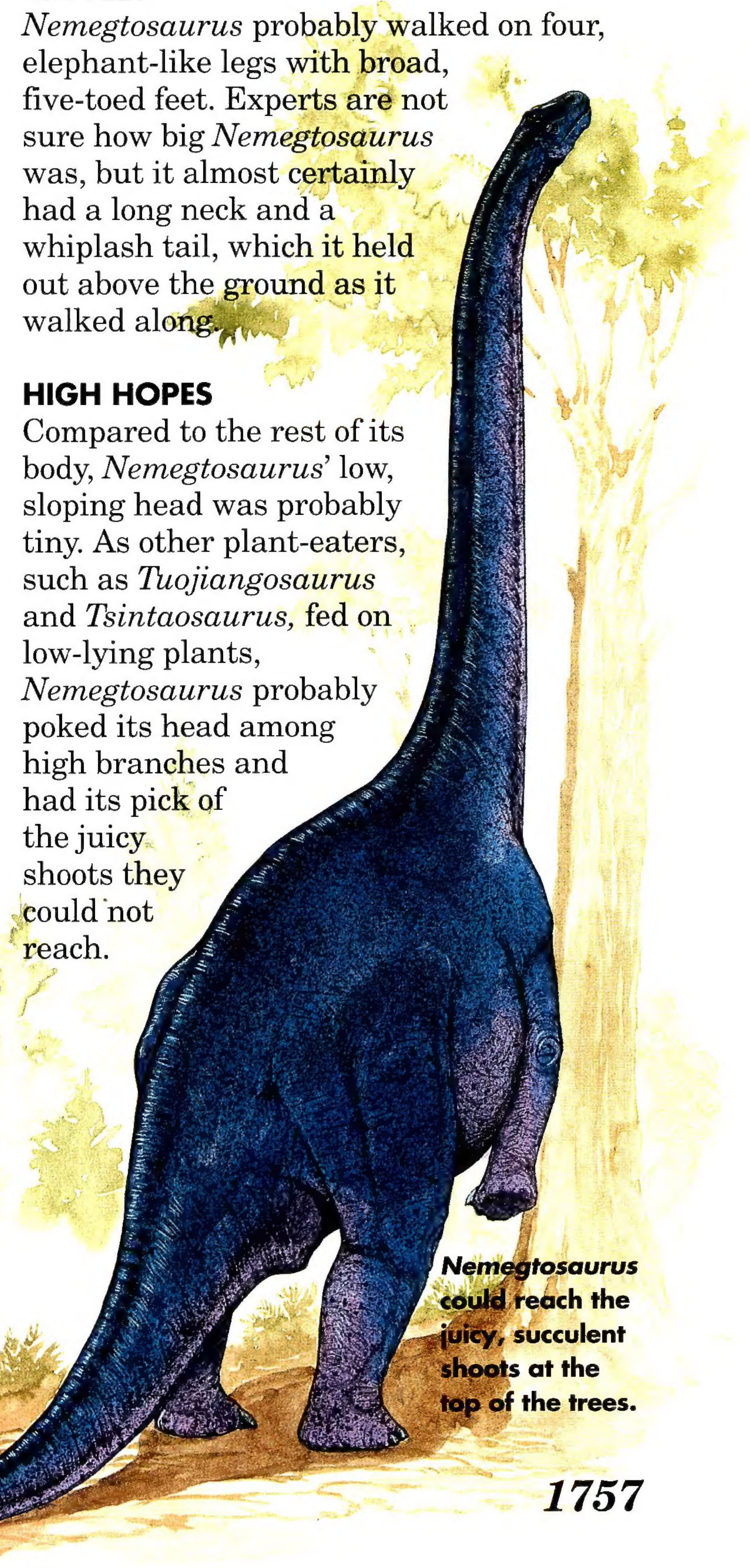
- **NAME:** *Nemegtosaurus* (nem-egt-oh-saw-rus) means 'Nemegt reptile' after a valley in the Gobi Desert, Mongolia
- **GROUP:** dinosaur
- **SIZE:** unknown
- **FOOD:** plants
- **LIVED:** about 75 million years ago in the Late Cretaceous Period in Mongolia

BIG FEET

Nemegtosaurus probably walked on four, elephant-like legs with broad, five-toed feet. Experts are not sure how big *Nemegtosaurus* was, but it almost certainly had a long neck and a whiplash tail, which it held out above the ground as it walked along.

HIGH HOPES

Compared to the rest of its body, *Nemegtosaurus*' low, sloping head was probably tiny. As other plant-eaters, such as *Tuojiangosaurus* and *Tsintaosaurus*, fed on low-lying plants, *Nemegtosaurus* probably poked its head among high branches and had its pick of the juicy shoots they could not reach.



Nemegtosaurus could reach the juicy, succulent shoots at the top of the trees.

Shelly beasts

Placodonts, turtles and tortoises had armour-like shells to protect them from their enemies.

Imagine an animal that looks like a 2m-long giant newt. Give it the head of a tuskless walrus. What you are seeing is *Placodus*, a Mid-Triassic sea animal. It was one of the first of a group of animals called the placodonts.

SHELLFISH FOR LUNCH

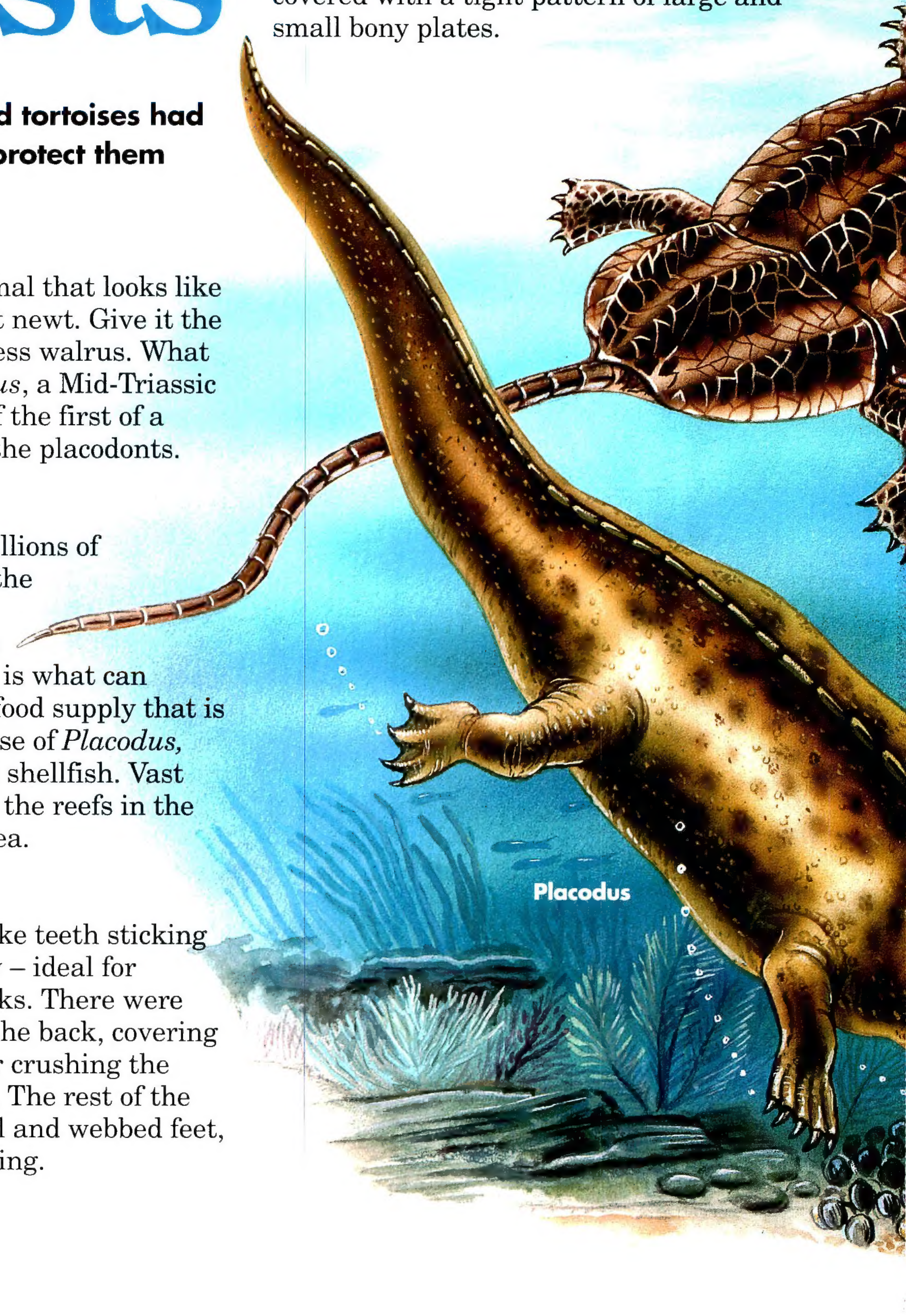
It seems strange that millions of years after animals left the water to live on land, some should evolve to go back to the sea. But this is what can happen when there is a food supply that is not being used. In the case of *Placodus,* the food going spare was shellfish. Vast beds of these lived along the reefs in the shallows of the Tethys Sea.

LIFE BENEATH THE SEA

Placodus had long peg-like teeth sticking out at the front of its jaw – ideal for plucking shellfish off rocks. There were also broad, flat teeth at the back, covering the roof of the mouth, for crushing the shells to get at the meat. The rest of the body, with its flexible tail and webbed feet, was designed for swimming.

KEEPING SHARKS AWAY

Placodus had a row of bony knobs along its backbone. This was not very effective as armour, especially as there were many other fierce sea animals around. Later placodonts were much more heavily armoured. *Placochelys,* from the Middle and Late Triassic, had a broad back covered with a tight pattern of large and small bony plates.



FROM TEETH TO BEAK

Placochelys still had *Placodus*' crushing teeth at the back of the mouth. But the long, front teeth had disappeared, to be replaced by a tough, horny beak that was even better for picking off shellfish.

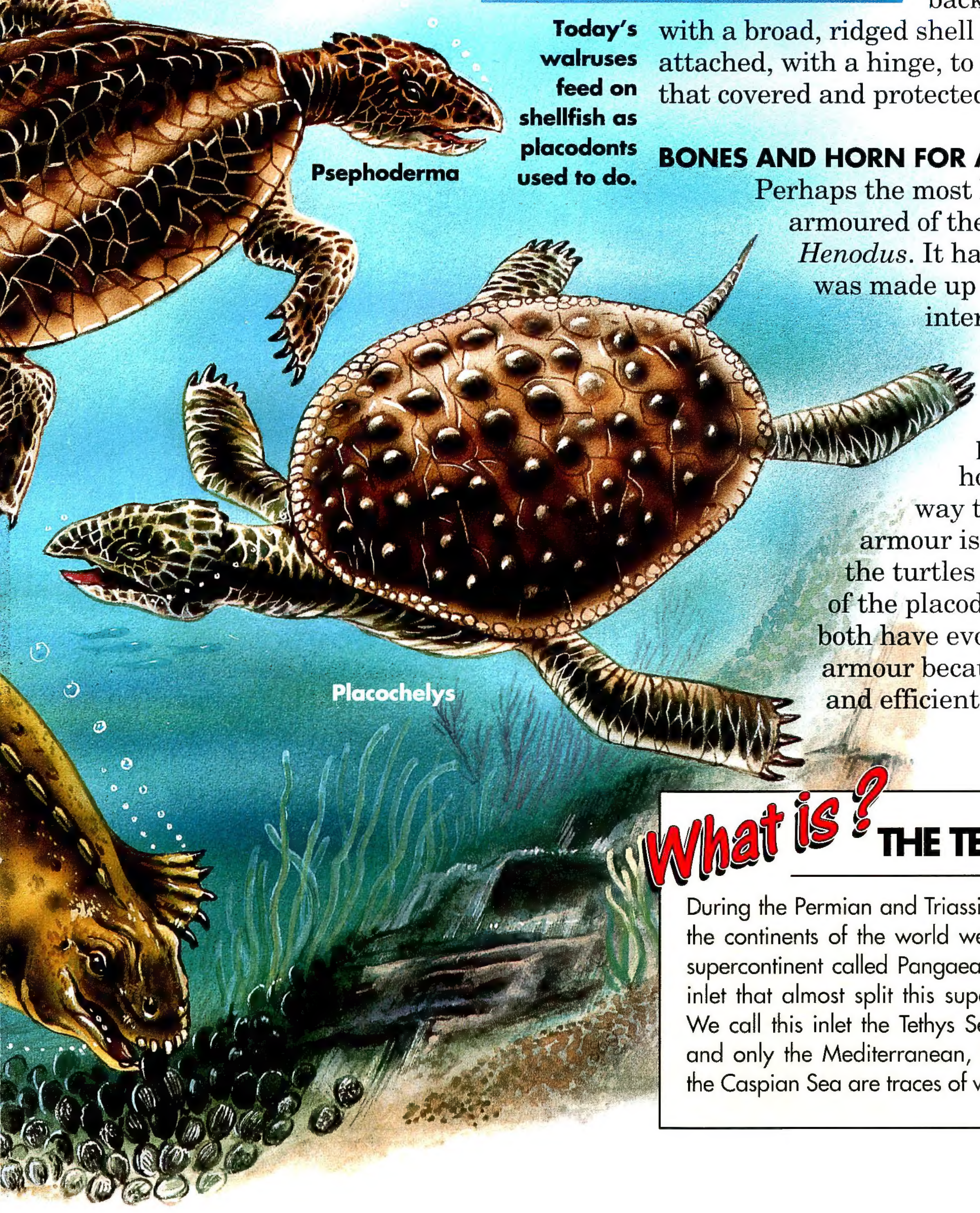
Today's walruses feed on shellfish as placodonts used to do.

HINGED SHELL

Another placodont, this time with a two-part shell, was *Psephoderma*. This creature was about 2m long, but much of that length was a long, narrow tail. Its back was covered with a broad, ridged shell and this was attached, with a hinge, to a separate shell that covered and protected the hips.

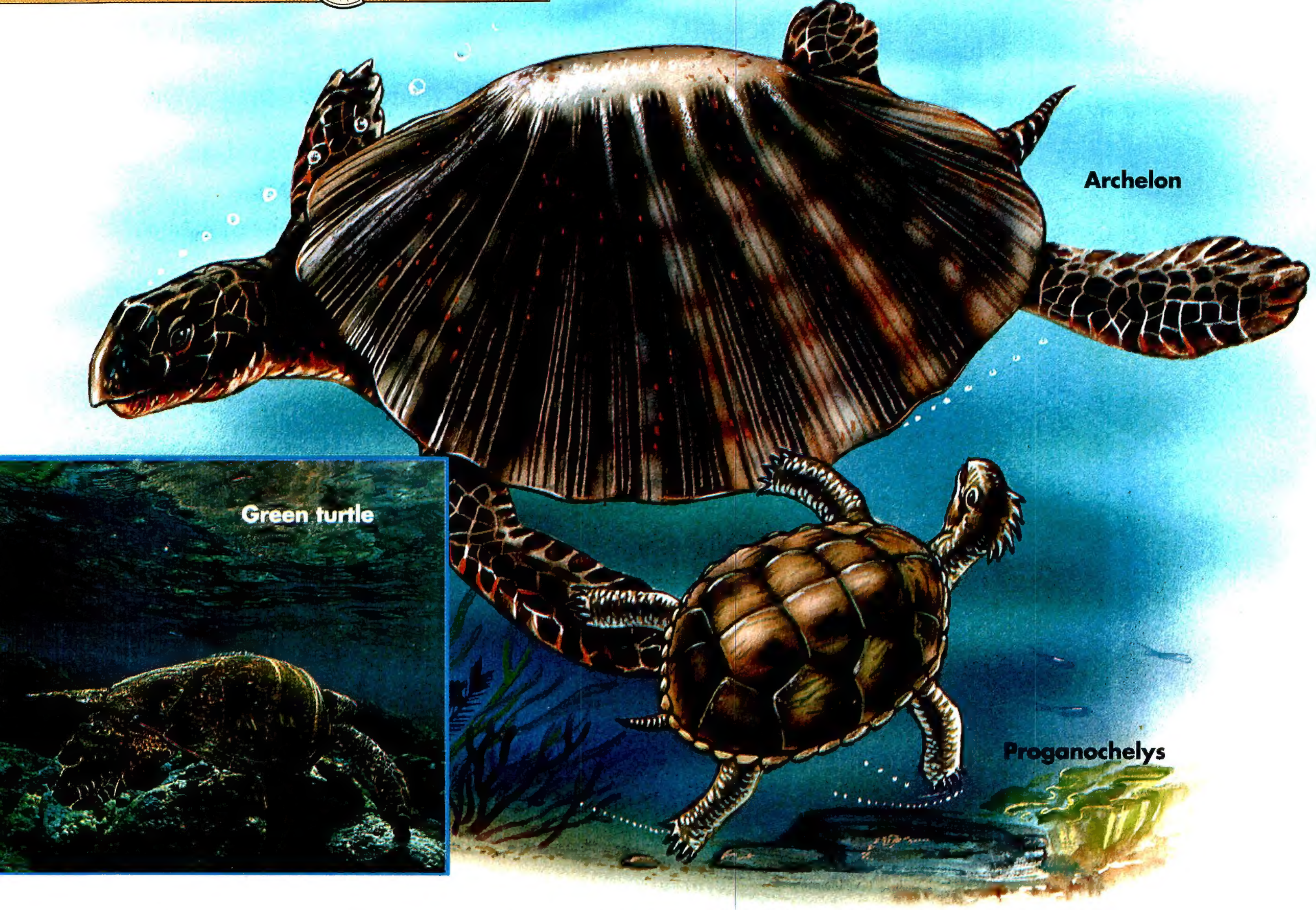
BONES AND HORN FOR ARMOUR

Perhaps the most heavily armoured of the placodonts was *Henodus*. It had a shell that was made up of a pattern of interlocking bones. On top of this were overlapping plates made of horn. This is the way that a turtle's armour is arranged, but the turtles are not relatives of the placodonts. They must both have evolved the same armour because it was strong and efficient.



What is ? THE TETHYS SEA

During the Permian and Triassic Periods, when all the continents of the world were united into one supercontinent called Pangaea, there was a long inlet that almost split this supercontinent in two. We call this inlet the Tethys Sea. It is gone now, and only the Mediterranean, the Black Sea and the Caspian Sea are traces of where it once was.



***Archelon* was the biggest-ever sea turtle. Today's turtles look very much like *Proganochelys*.**

FAMILY RESEMBLANCES

Some scientists think that pareiasaurs, the plant-eating land reptiles of the Permian, were the ancestors of turtles and tortoises. The leg and toe bones of pareiasaurs and turtles and tortoises seem to have been very similar. Also, the same number of vertebrae were attached to the hip bones of both groups.

EXTRA EVIDENCE

Details like this are usually enough to suggest that two groups are related. Pareiasaurs also had bony knobs in the skin on their backs. These could well have evolved into the bones of a turtle's shell.

DESIGN WAS RIGHT FIRST TIME

The earliest true turtle that we know of was *Proganochelys,* from the Triassic Period in Germany. Despite the fact that it was very primitive, it had exactly the same layout of bones and horny plates in its shell as that of today's turtles.

What is? THE DIFFERENCE BETWEEN A TURTLE AND A TORTOISE

It depends on where you are. In America, they are usually all called turtles. In Britain, the land-living beasts are called tortoises, the sea-dwellers are called turtles, and those that live in fresh water are called terrapins.

TWO TYPES OF DEFENCE

Turtles today are divided into two groups – those that pull their heads straight back into their shells, and those that swing their heads back sideways. Both groups have been around since the Jurassic Period at least.

AS BIG AS A BOAT

The biggest sea turtle that ever lived was *Archelon*, which swam in the shallow sea that covered much of North America in the Late Cretaceous Period. This animal, as big as a rowing boat, had lost most of the armour its ancestors had.

TOO BIG FOR A HARD SHELL

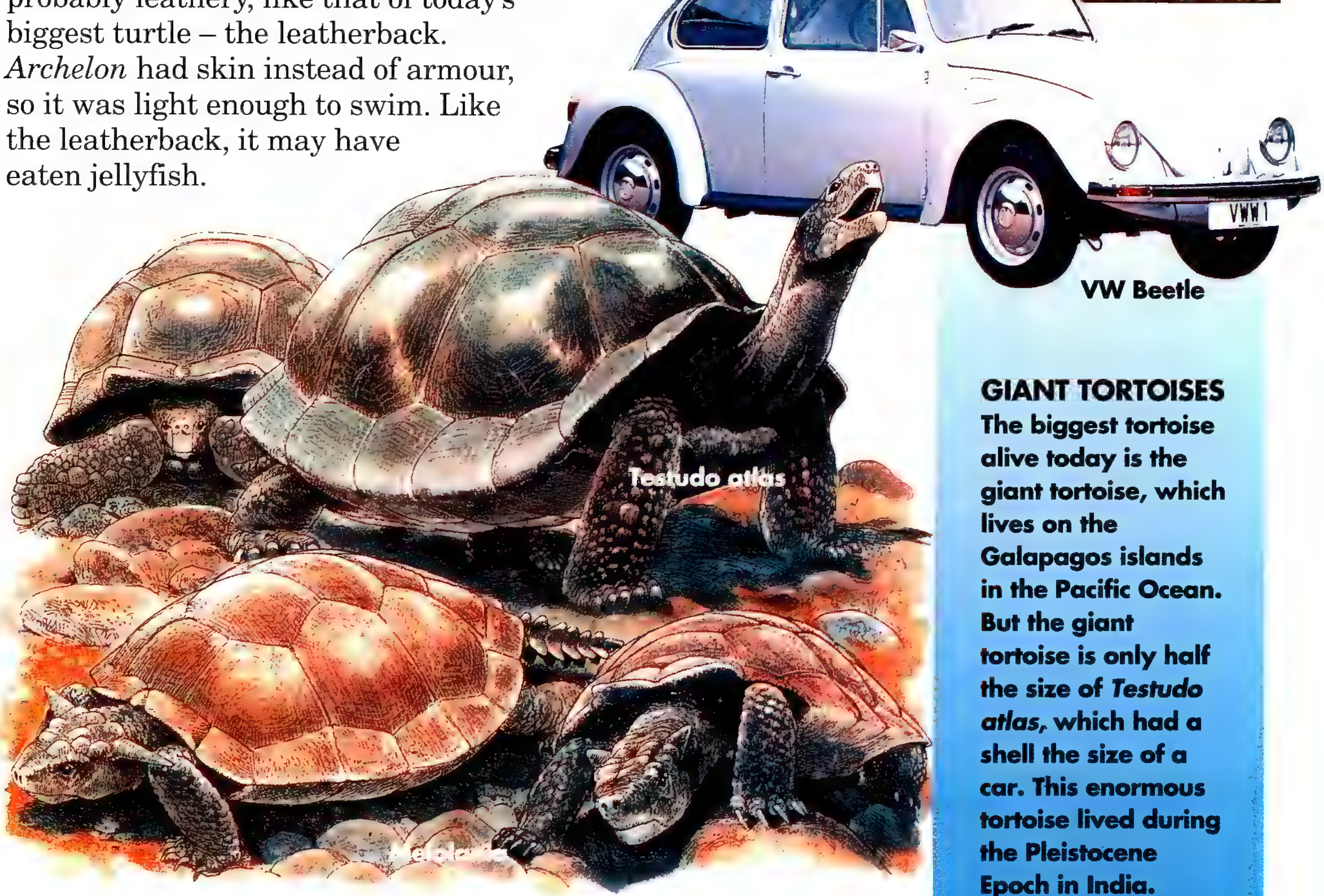
Archelon was covered by thick skin, supported by bony struts. The skin was probably leathery, like that of today's biggest turtle – the leatherback. *Archelon* had skin instead of armour, so it was light enough to swim. Like the leatherback, it may have eaten jellyfish.

ICE-AGE GIANTS

The biggest land tortoise was around during the Pleistocene in India. Called *Testudo atlas*, or *Colossochelys*, it was closely related to today's tortoises. Its shell was as big as a Volkswagen Beetle car!

SPINES AND SPIKES

A giant oddity from the same place and the same time was *Meiolania*. Its shell was 2.5m long and its head was covered with spines and spikes. Its tail was also armoured. It probably did not need to pull itself into its shell for protection.



VW Beetle

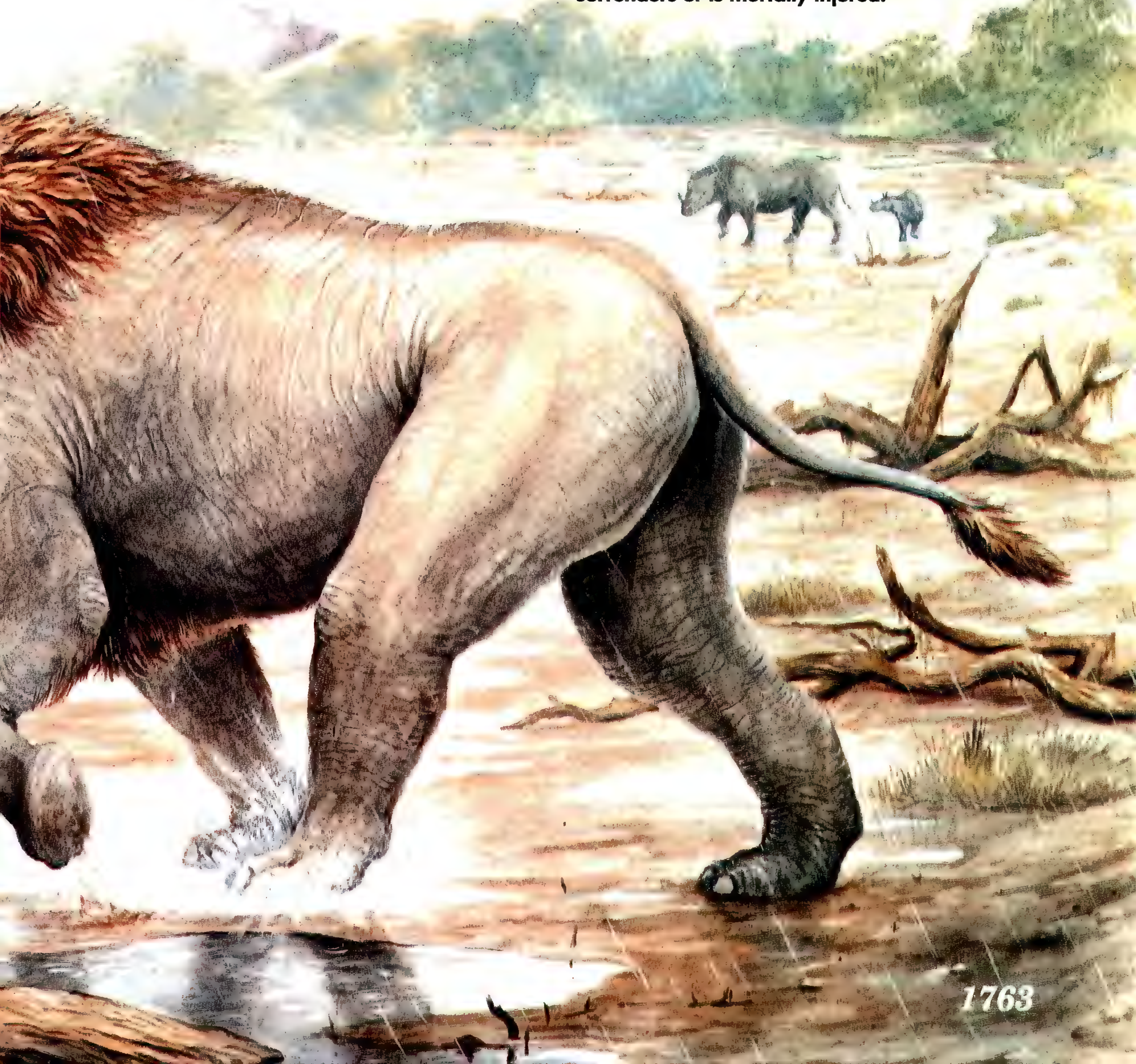
GIANT TORTOISES

The biggest tortoise alive today is the giant tortoise, which lives on the Galapagos islands in the Pacific Ocean. But the giant tortoise is only half the size of *Testudo atlas*, which had a shell the size of a car. This enormous tortoise lived during the Pleistocene Epoch in India.

GIANTS OF THE PAST

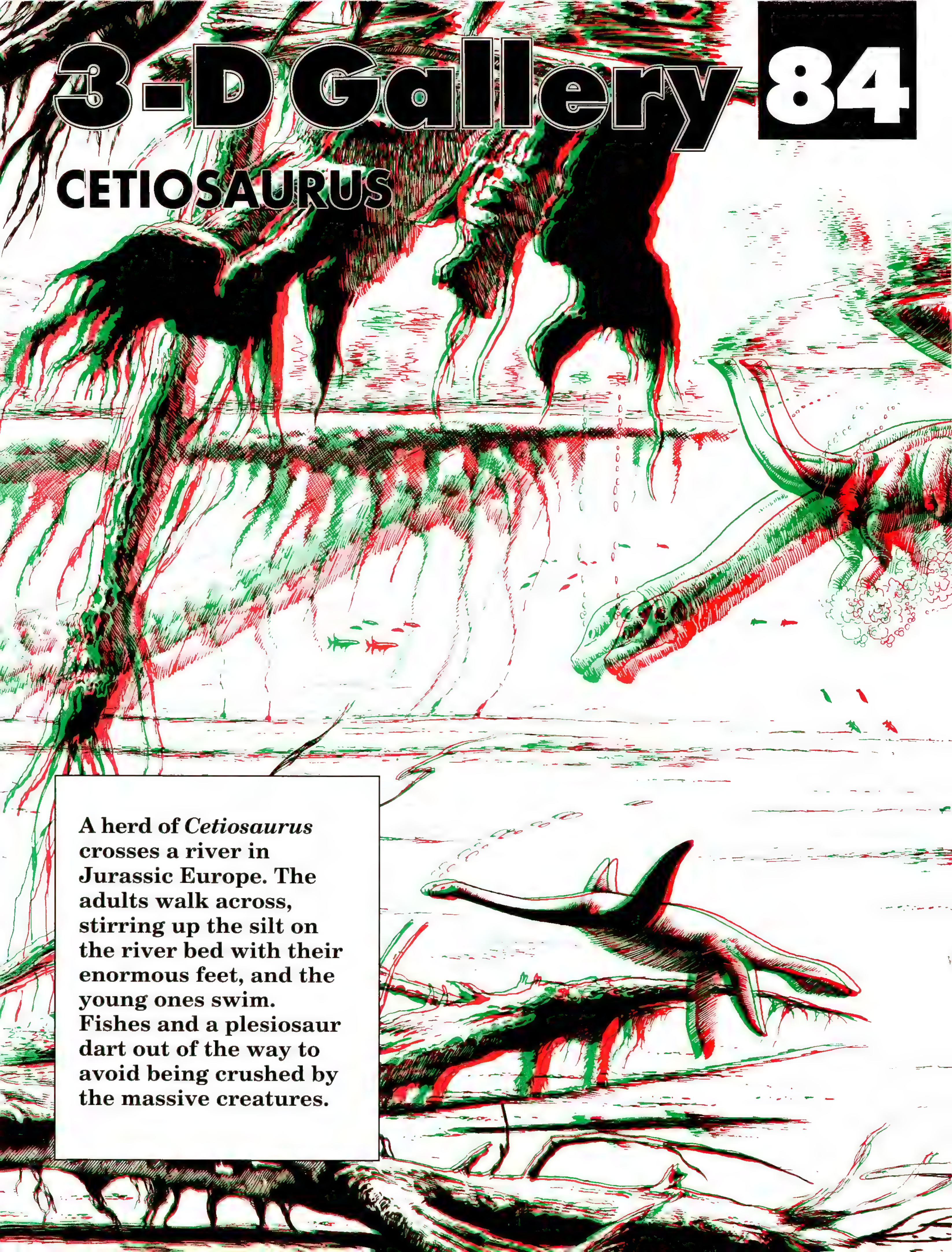
BRONTOTHERIUM

Two male *Brontotherium* fight for leadership of the herd on the open plains of Early Oligocene North America. Their weapons are their strange, V-shaped nose horns. They lock their horns together and twist and turn from side to side, using all their strength. The battle will probably not be decided until one *Brontotherium* surrenders or is mortally injured.

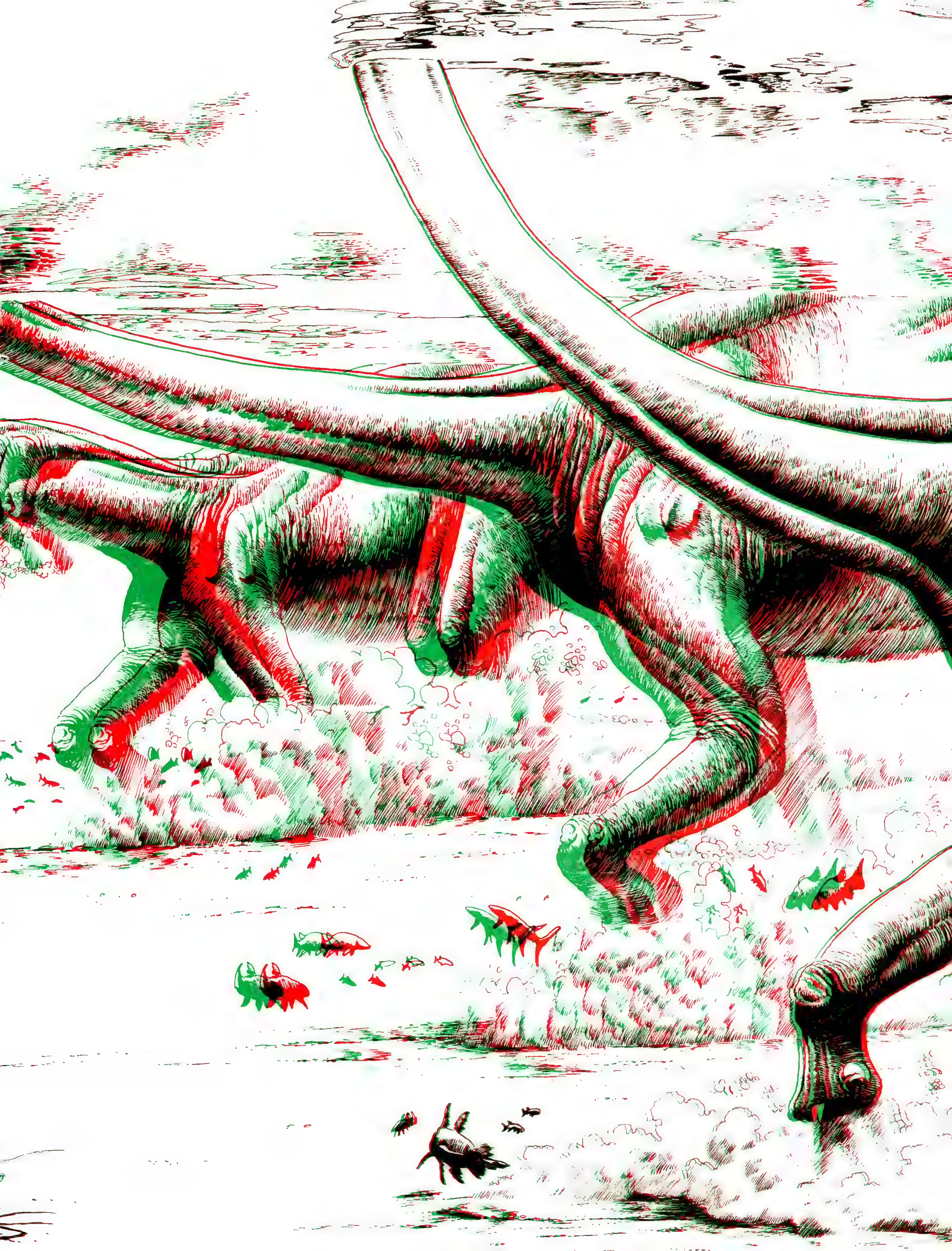


3-D Gallery 84

CETIOSAURUS



A herd of *Cetiosaurus* crosses a river in Jurassic Europe. The adults walk across, stirring up the silt on the river bed with their enormous feet, and the young ones swim. Fishes and a plesiosaur dart out of the way to avoid being crushed by the massive creatures.



Dinosaurs in books and comics

Stories about dinosaurs have terrorised us for almost 100 years.

Hundreds of thousands of people have read Michael Crichton's frightening book 'Jurassic Park', about dinosaurs brought back to life. And Steven Spielberg's film of the book was one of the biggest hits ever.

TYRANNOSAURUS TERROR

Crichton's idea that scientists could grow new dinosaurs in the laboratory was a terrifying fantasy – especially when the experiment starts to get out of hand and the dinosaurs try to take over!

IT'S A FACT

SPLASH OF THE TITANS

Prehistoric monsters appeared in print long before dinosaurs did. In Jules Verne's book 'A Journey to the Centre of the Earth,' written in 1864, an ichthyosaur battled with a plesiosaur in an underground lake.

AAAAGH!

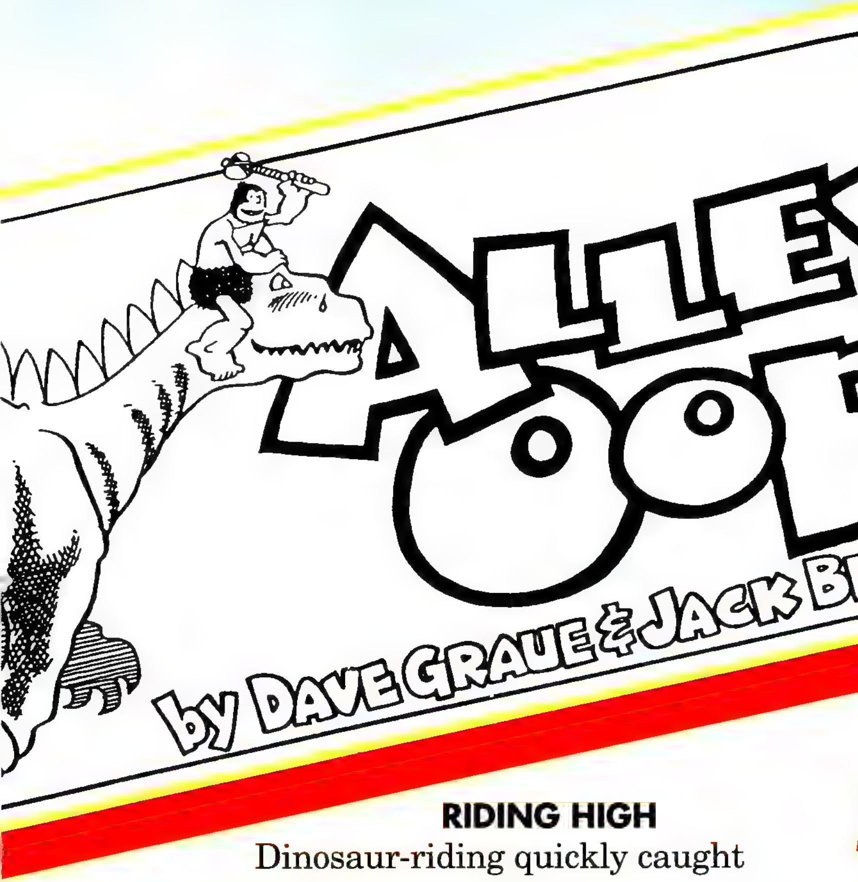
Tyrannosaurus rex escapes and attacks other dinosaurs and people. *Velociraptors* prove deadly when they get loose and go hunting humans. And then the dinosaurs begin to breed…

LOST WORLD

In 'The Lost World' by Sir Arthur Conan Doyle, a palaeontologist – Professor Challenger – discovers a secret dinosaur colony hidden away on a mountain in South America.

ME TARZAN

Edgar Rice Burroughs wrote many stories about dinosaurs and prehistoric animals. Tarzan was one of his first heroes. In 'Tarzan the Terrible', Tarzan tames a giant *Triceratops*. He even manages to ride it!


ALLEY OOP®
by DAVE GRAUE & JACK BEN

SPOTTER'S GUIDE

'Alley Oop' (left and below), the first dinosaur cartoon strip, was created in 1934. Edgar Rice Burroughs' Tarzan (below) had amazing animal know-how. He could even tame dinosaurs!

RIDING HIGH

Dinosaur-riding quickly caught on in books and comics. In the first dinosaur cartoon strip, 'Alley Oop', written by V.T. Hamlin, a caveman trots about on a long-necked *Stegosaurus* called Dinny. Later comic-strip cavemen made their dinosaurs work even harder. Fred Flintstone used a sauropod as a giant crane!

ALLEY OOP
by DAVE GRAUE & JACK BENDER
YOU HEAR ME, Y'BIG BEETLE BRAIN?? YOU COME BACK HERE!!!
GLUNK
DANG IT, DINNY, Y'CAN'T DO THIS TO ME!!!
NOW HOW'M I GONNA CONVINCE THIS BIG HAMMERHEAD IT WASN'T HIM I WAS YELLIN' AT?
YIKES!
GRRRRRR
DAVE GRAUE \ JACK BENDER

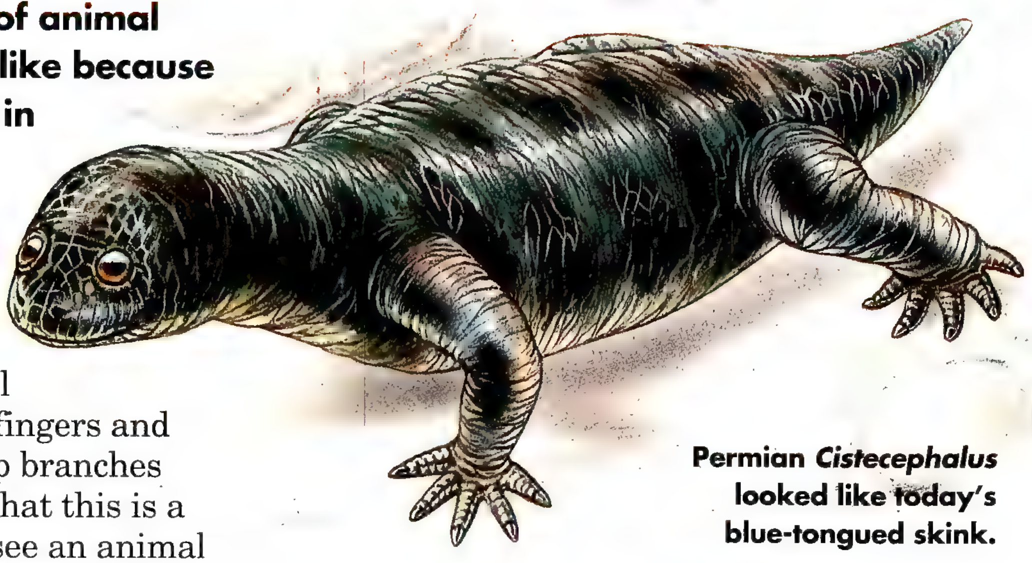
A scene from 'The Lost World' by Sir Arthur Conan Doyle, better known as the creator of the famous detective Sherlock Holmes.

SCARY-PODS AND TERRIFIED T REXES

In a 1950s' comic strip called 'Thund'a', a World War II plane crashes into a sauropod. The pilot just manages to escape, but the sauropod shakes the plane 'as a dog would shake a rat'. Most children's books and comics show dinosaurs as more lovable monsters. When a small blue car hoots at a mighty *T rex* in Val Biro's 'Gumdrop', the dinosaur runs for its life!

The lookalikes

Totally different types of animal evolved to look very alike because they lived similar lives in similar habitats and environments.

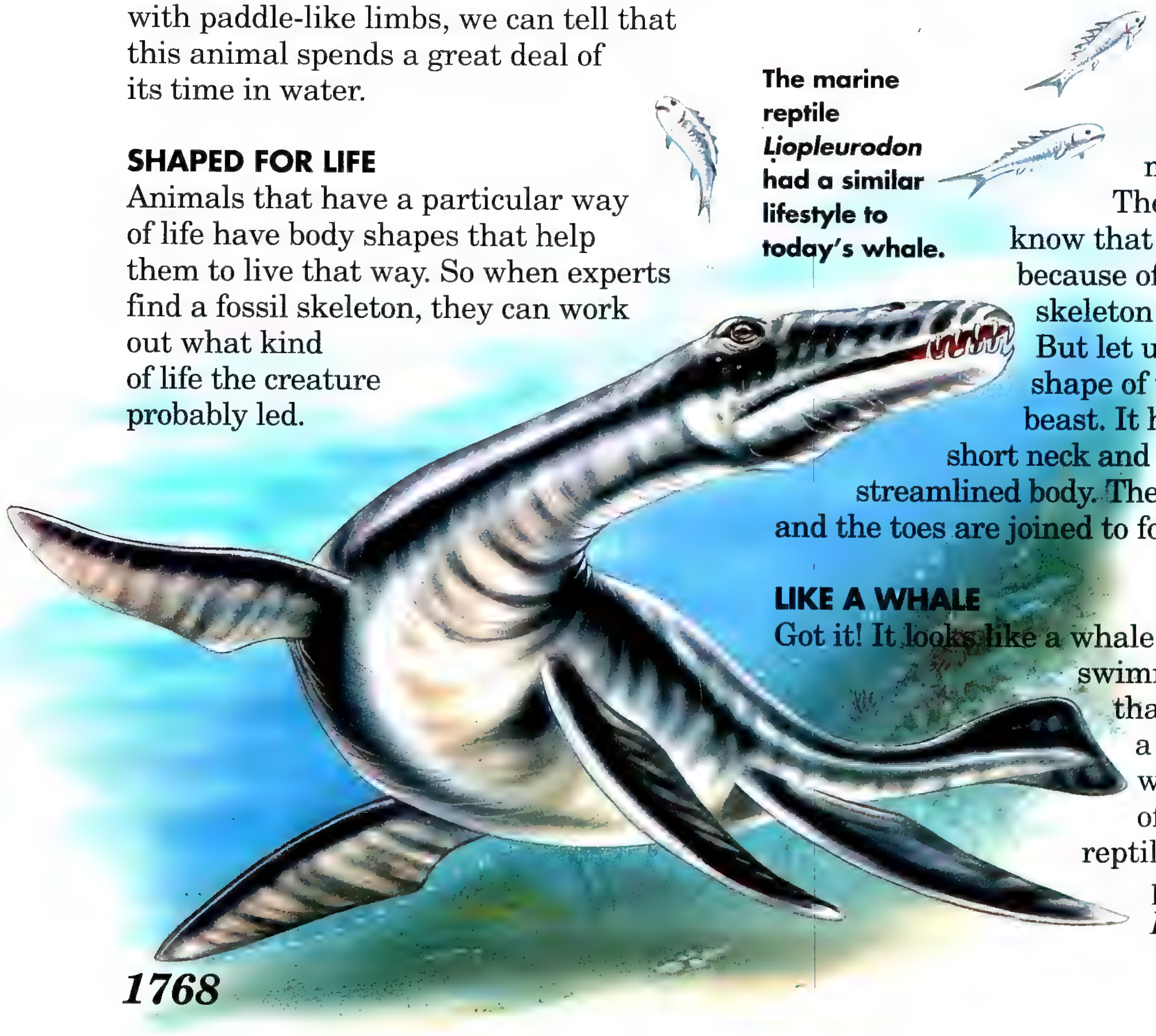


Permian *Cistecephalus* looked like today's blue-tongued skink.

If we look at an animal that has long fingers and strong arms, able to grasp branches and twigs, we can guess that this is a tree-living animal. If we see an animal with paddle-like limbs, we can tell that this animal spends a great deal of its time in water.

SHAPED FOR LIFE

Animals that have a particular way of life have body shapes that help them to live that way. So when experts find a fossil skeleton, they can work out what kind of life the creature probably led.



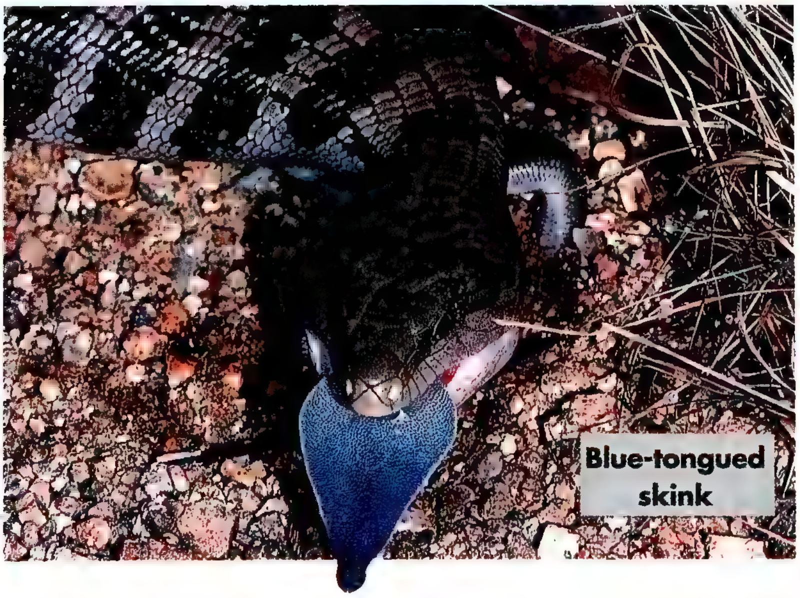
The marine reptile *Liopleurodon* had a similar lifestyle to today's whale.

WHALE OF A CLUE

Imagine the skeleton of a marine reptile. The reason we know that it is a reptile is because of the way the skeleton is arranged. But let us look at the shape of the whole beast. It has a big head, short neck and torpedo-shaped, streamlined body. The limbs are short and the toes are joined to form a paddle.

LIKE A WHALE

Got it! It looks like a whale. It is a big, swimming animal that may have led a similar life to a whale. It is one of the marine reptiles, the Jurassic pliosaur, *Liopleurodon*.



Blue-tongued skink

DIG IT?

Here is another mystery reptile with a streamlined body, but it is only about 30cm long and it lived in Permian times. Its head is flat. Its limbs are stumpy and strong, with broad toes for digging.

LIKE A LIZARD

Got it! It looks like a modern lizard called the blue-tongued skink. Our mystery creature is a mammal-like reptile called *Cistecephalus*, and it probably lived like the skink does today, digging for insects.

BIRD-LIKE

Pterosaurs flew, and so do birds. Some were similar to birds in other ways. Imagine you have found a Cretaceous pterosaur with narrow jaws full of fine bristles. Now what were these for?

LIKE A FLAMINGO

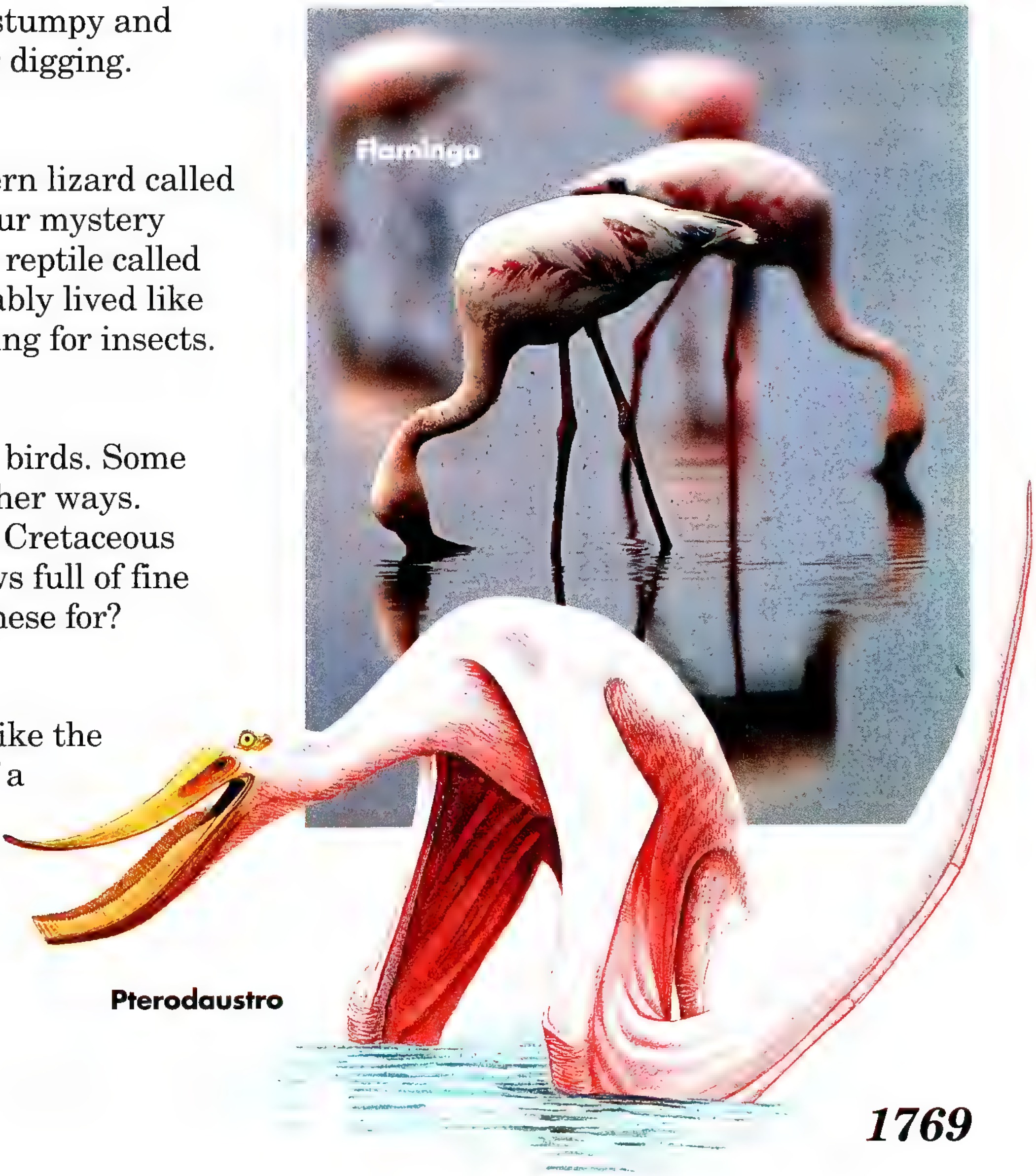
Got it! These bristles are like the fine bristles in the beak of a flamingo. This pterosaur, *Pterodaustro*, must have lived like a flamingo, sieving shrimps out of the water with its strange mouth. Perhaps it was pink like a flamingo, too.

What is? CONVERGENT EVOLUTION

Convergent evolution is when unrelated animals evolve the same body shape. This occurs when animals lead similar lives in similar environments. The body shape they both evolve is the one most suitable to that environment and lifestyle.

SCIENTIFIC NAME

A whale is a mammal, *Liopleurodon* was a reptile. They are completely different and unrelated animals, yet they have the same shaped bodies. Scientists call this ‘convergent evolution’.

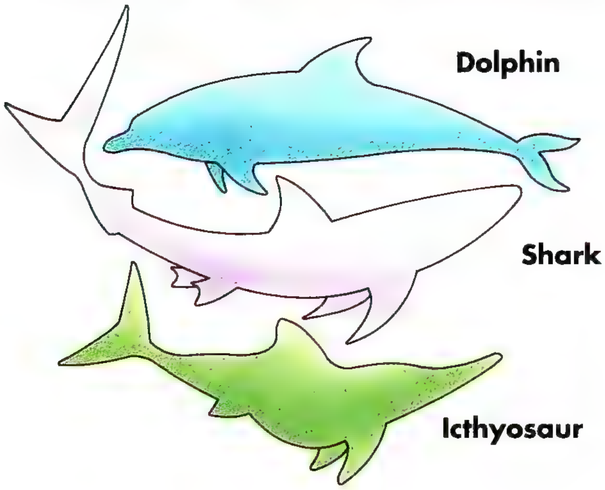


Pterodaustro

TIME DETECTIVE

STREAMLINED

There have been streamlined fish (sharks) since Devonian times. In the Triassic came the ichthyosaurs – streamlined reptiles. Nowadays we have dolphins – streamlined mammals. All have sharp teeth, back and tail fins and paired fins along the body.



SAME BODY SHAPE

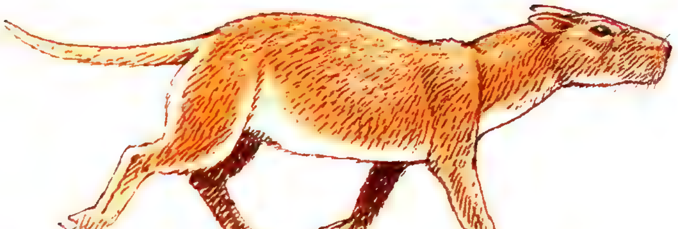
So because dolphins, sharks and icthyosaurs have very similar ways of life, powering through the water in search of food, their bodies have evolved to look almost the same.

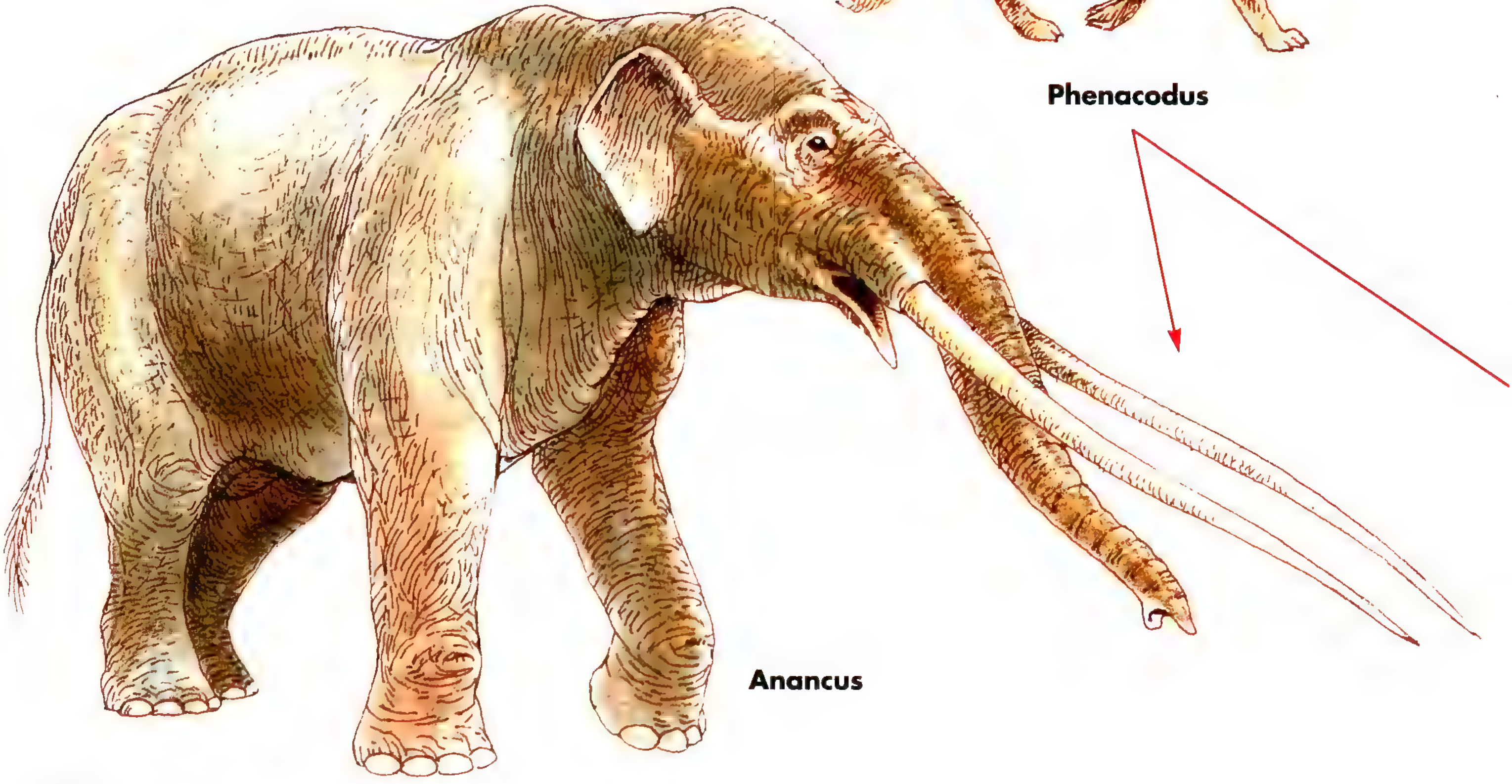
FROM THE SAME ANCESTORS

Lookalikes come about for another reason, too. Sometimes animals with the same ancestor continue to evolve in similar ways, even though they live thousands of miles apart on different continents. This is called parallel evolution.

TRUNKS AND TUSKS

Amongst the earliest South American mammals were condylarths such as *Phenacodus*. Condylarths evolved into all kinds of beasts. Amongst them was a very large animal called *Pyrotherium*. To enable it to reach for food, its nose developed into a long trunk. Its front teeth became long tusks which were used as tools. In Africa, half a world away, the condylarths were evolving into the elephants, such as *Anancus*, which looked almost exactly the same as *Pyrotherium*.


Phenacodus


Anancus

HORSE OF COURSE?

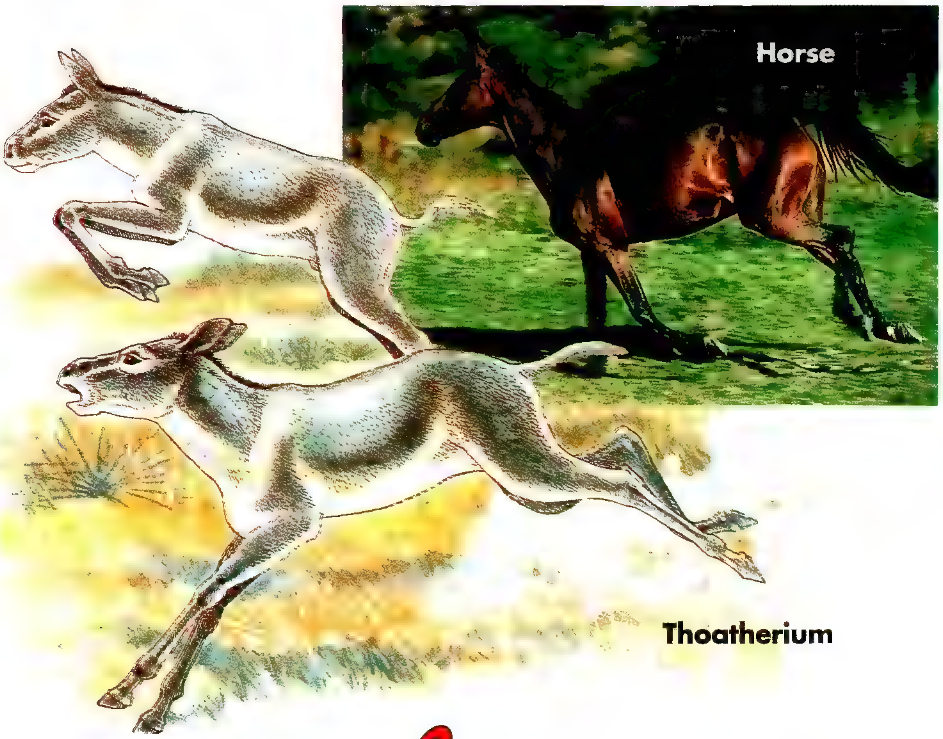
It is a mammal. It has a long skull with strong jaws and teeth made for cropping and chewing grass. Specially designed for running, it has long, slim legs and only one toe with a big hoof on each foot. Got it! It is a horse. It must be. That is the only thing that has a single toe and eats grass, isn't it?

WRONG AGAIN

But it isn't. It is *Thoatherium*, a South American Miocene mammal, only distantly related to horses. Both *Thoatherium* and the horse had the same hoofed ancestor, a long way back at the beginning of the Age of the Mammals.

SAME CHANGES

They both evolved to live in exactly the same conditions, but one lived in North America and one lived in South America. They both had to cope with the same grassland conditions so, not surprisingly, they evolved in similar or parallel ways.

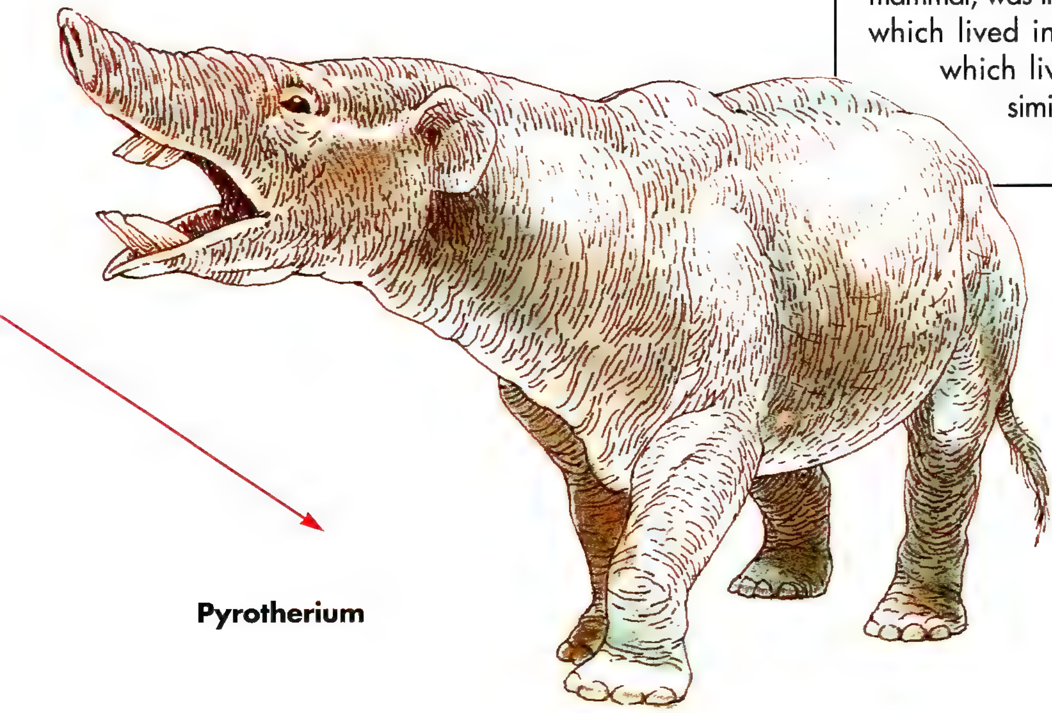


Horse

Thoatherium

What is? PARALLEL EVOLUTION

Parallel evolution is a bit like convergent evolution except that the different animals evolve from the same ancestors. They may be on different continents, but they go through the same changes and end up looking like one another. For example, *Phenacodus*, a condylarth and the earliest-known mammal, was the common ancestor of *Pyrotherium*, which lived in South America, and *Anancus*, which lived in Africa. You can see how similar they looked.

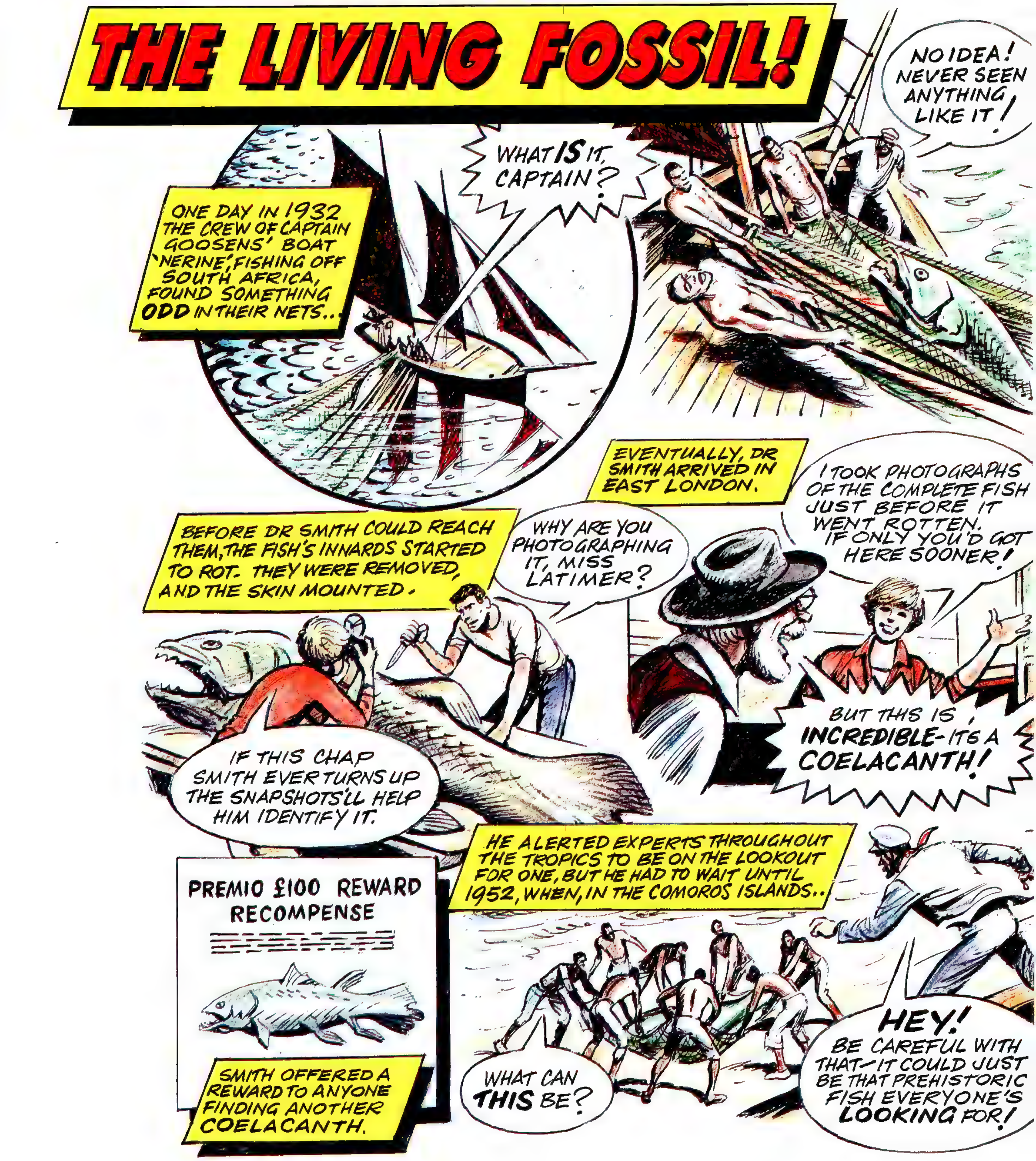


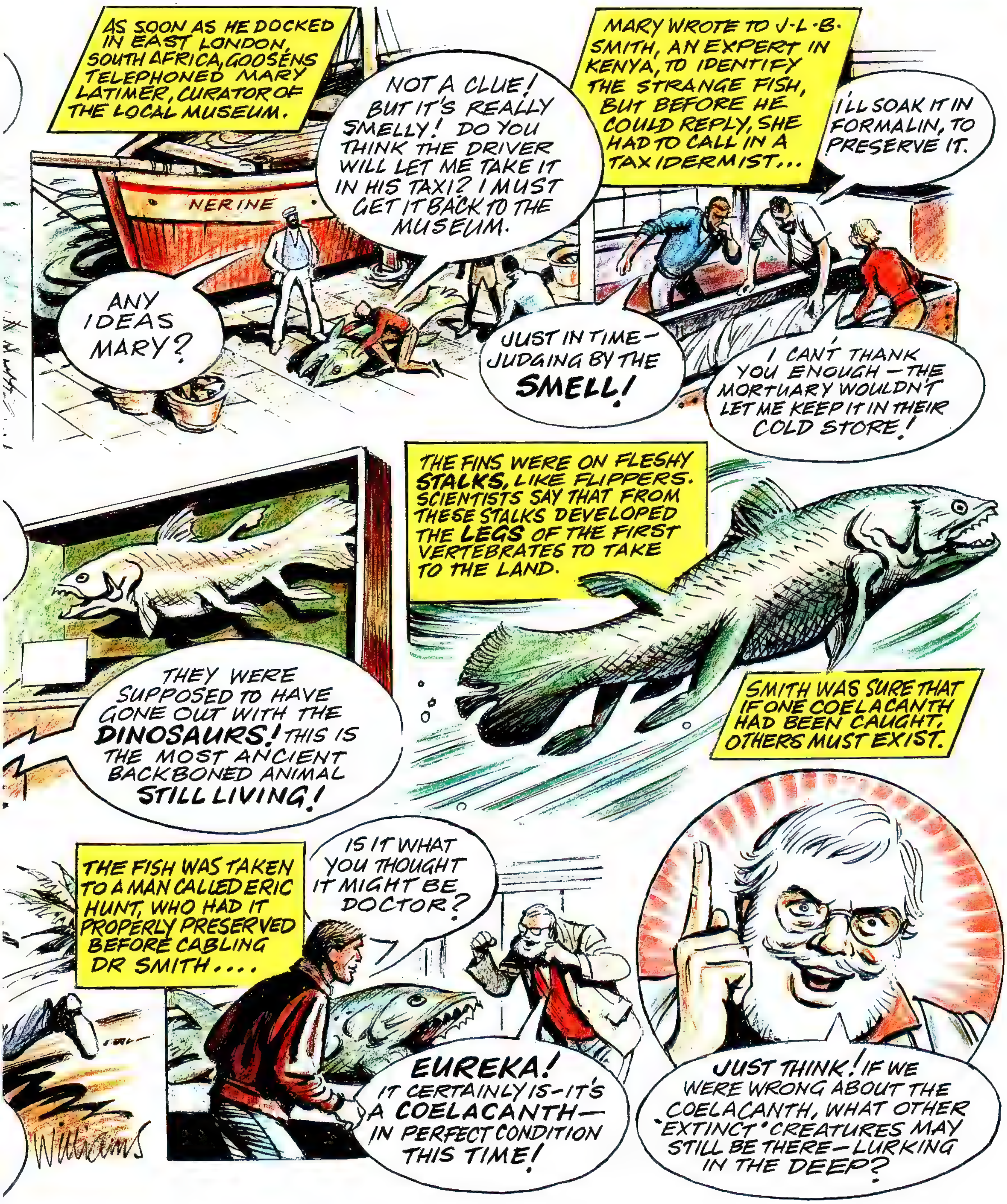
Pyrotherium

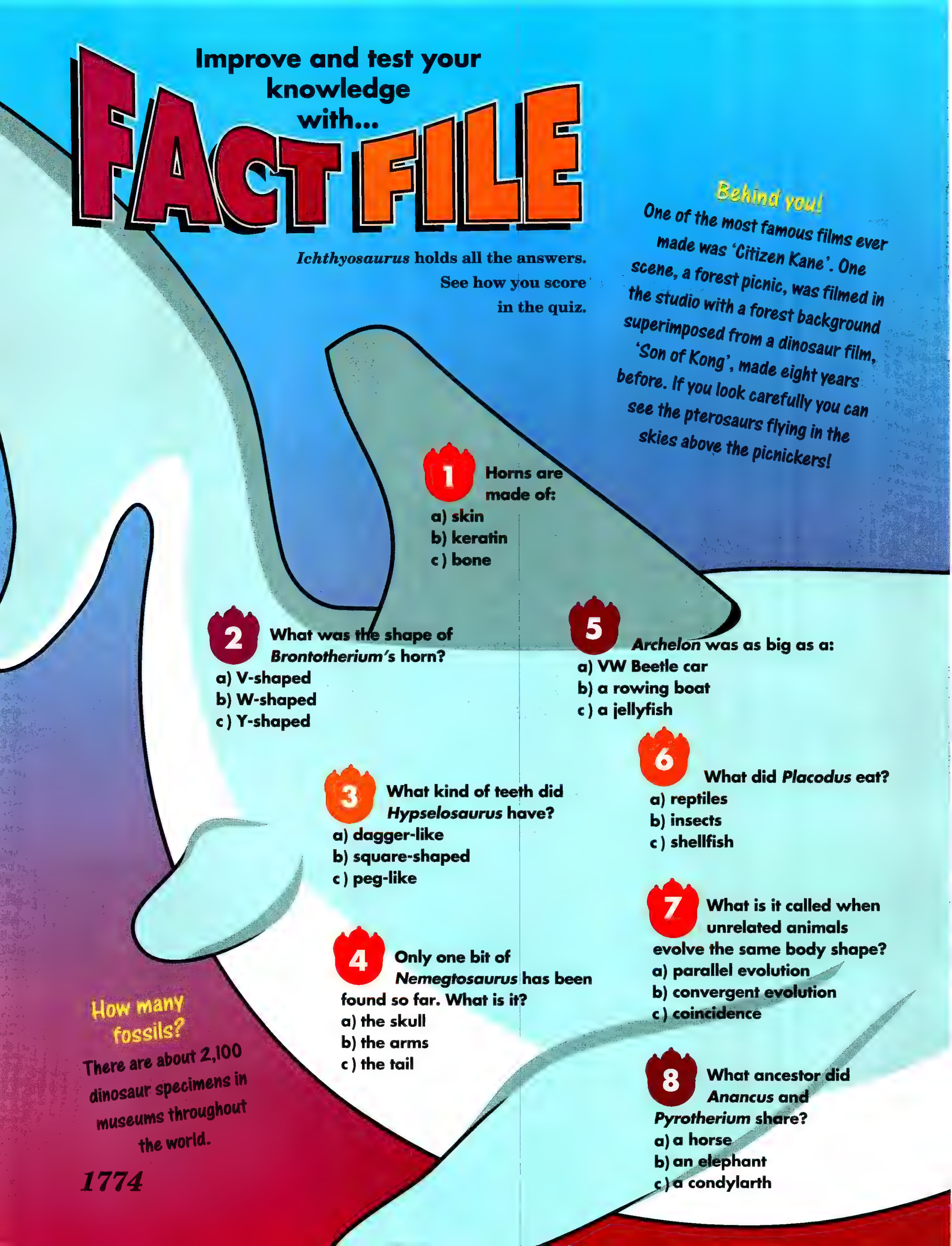
USEFUL CLUES

When experts find fossils, knowing about convergent and parallel evolution helps them to work out what sort of creature they have found. They can look at other animals with similar lifestyles for clues.

THE LIVING FOSSIL!


ONE DAY IN 1932 THE CREW OF CAPTAIN GOOSENS' BOAT 'NERINE', FISHING OFF SOUTH AFRICA, FOUND SOMETHING **ODD** IN THEIR NETS..
WHAT **IS** IT, CAPTAIN?
NO IDEA! NEVER SEEN ANYTHING LIKE IT!
BEFORE DR SMITH COULD REACH THEM, THE FISH'S INNARDS STARTED TO ROT. THEY WERE REMOVED, AND THE SKIN MOUNTED.
WHY ARE YOU PHOTOGRAPHING IT, MISS LATIMER?
IF THIS CHAP SMITH EVER TURNS UP THE SNAPSHOTS'LL HELP HIM IDENTIFY IT.
EVENTUALLY, DR SMITH ARRIVED IN EAST LONDON.
I TOOK PHOTOGRAPHS OF THE COMPLETE FISH JUST BEFORE IT WENT ROTTEN. IF ONLY YOU'D GOT HERE SOONER!
BUT THIS IS **INCREDIBLE** - IT'S A **COELACANTH!**
PREMIO £100 REWARD RECOMPENSE
SMITH OFFERED A REWARD TO ANYONE FINDING ANOTHER COELACANTH.
HE ALERTED EXPERTS THROUGHOUT THE TROPICS TO BE ON THE LOOKOUT FOR ONE, BUT HE HAD TO WAIT UNTIL 1952, WHEN, IN THE COMOROS ISLANDS..
WHAT CAN **THIS** BE?
HEY! BE CAREFUL WITH THAT - IT COULD JUST BE THAT PREHISTORIC FISH EVERYONE'S **LOOKING** FOR!


AS SOON AS HE DOCKED IN EAST LONDON, SOUTH AFRICA, GOOSENS TELEPHONED MARY LATIMER, CURATOR OF THE LOCAL MUSEUM.
NERINE
ANY IDEAS MARY?
NOT A CLUE! BUT IT'S REALLY SMELLY! DO YOU THINK THE DRIVER WILL LET ME TAKE IT IN HIS TAXI? I MUST GET IT BACK TO THE MUSEUM.
MARY WROTE TO J·L·B· SMITH, AN EXPERT IN KENYA, TO IDENTIFY THE STRANGE FISH, BUT BEFORE HE COULD REPLY, SHE HAD TO CALL IN A TAXIDERMIST...
I'LL SOAK IT IN FORMALIN, TO PRESERVE IT.
JUST IN TIME— JUDGING BY THE **SMELL!**
I CAN'T THANK YOU ENOUGH—THE MORTUARY WOULDN'T LET ME KEEP IT IN THEIR COLD STORE!
THEY WERE SUPPOSED TO HAVE GONE OUT WITH THE **DINOSAURS!** THIS IS THE MOST ANCIENT BACKBONED ANIMAL **STILL LIVING!**
THE FINS WERE ON FLESHY **STALKS,** LIKE FLIPPERS. SCIENTISTS SAY THAT FROM THESE STALKS DEVELOPED THE **LEGS** OF THE FIRST VERTEBRATES TO TAKE TO THE LAND.
SMITH WAS SURE THAT IF ONE COELACANTH HAD BEEN CAUGHT, OTHERS MUST EXIST.
THE FISH WAS TAKEN TO A MAN CALLED ERIC HUNT, WHO HAD IT PROPERLY PRESERVED BEFORE CABLING DR SMITH....
IS IT WHAT YOU THOUGHT IT MIGHT BE DOCTOR?
EUREKA! IT CERTAINLY IS—IT'S A **COELACANTH**— IN PERFECT CONDITION THIS TIME!
JUST THINK! IF WE WERE WRONG ABOUT THE COELACANTH, WHAT OTHER 'EXTINCT' CREATURES MAY STILL BE THERE—LURKING IN THE DEEP?
Williams



Improve and test your knowledge with...

FACT FILE

Ichthyosaurus holds all the answers. See how you score in the quiz.

Behind you!

One of the most famous films ever made was 'Citizen Kane'. One scene, a forest picnic, was filmed in the studio with a forest background superimposed from a dinosaur film, 'Son of Kong', made eight years before. If you look carefully you can see the pterosaurs flying in the skies above the picnickers!

1 Horns are made of:
a) skin
b) keratin
c) bone

2 What was the shape of *Brontotherium's* horn?
a) V-shaped
b) W-shaped
c) Y-shaped

3 What kind of teeth did *Hypselosaurus* have?
a) dagger-like
b) square-shaped
c) peg-like

4 Only one bit of *Nemegtosaurus* has been found so far. What is it?
a) the skull
b) the arms
c) the tail

5 *Archelon* was as big as a:
a) VW Beetle car
b) a rowing boat
c) a jellyfish

6 What did *Placodus* eat?
a) reptiles
b) insects
c) shellfish

7 What is it called when unrelated animals evolve the same body shape?
a) parallel evolution
b) convergent evolution
c) coincidence

8 What ancestor did *Anancus* and *Pyrotherium* share?
a) a horse
b) an elephant
c) a condylarth

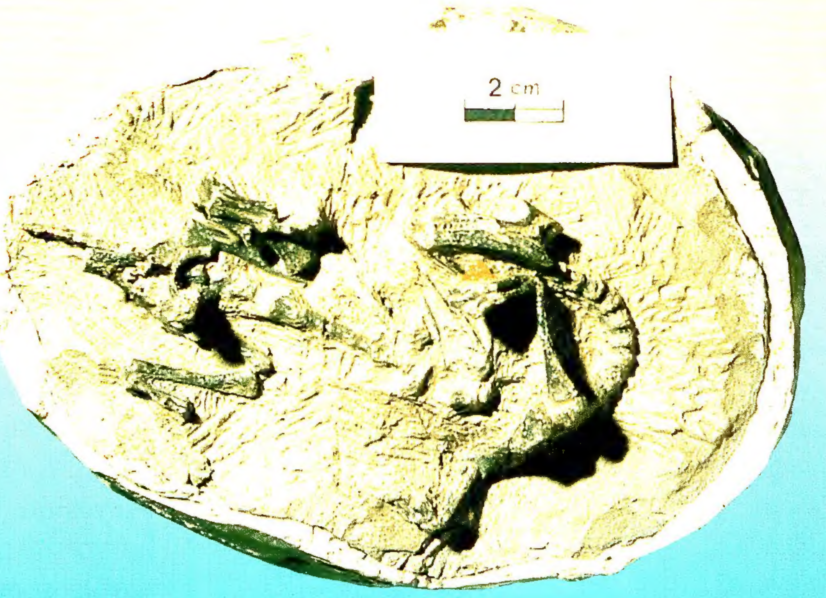
How many fossils?

There are about 2,100 dinosaur specimens in museums throughout the world.

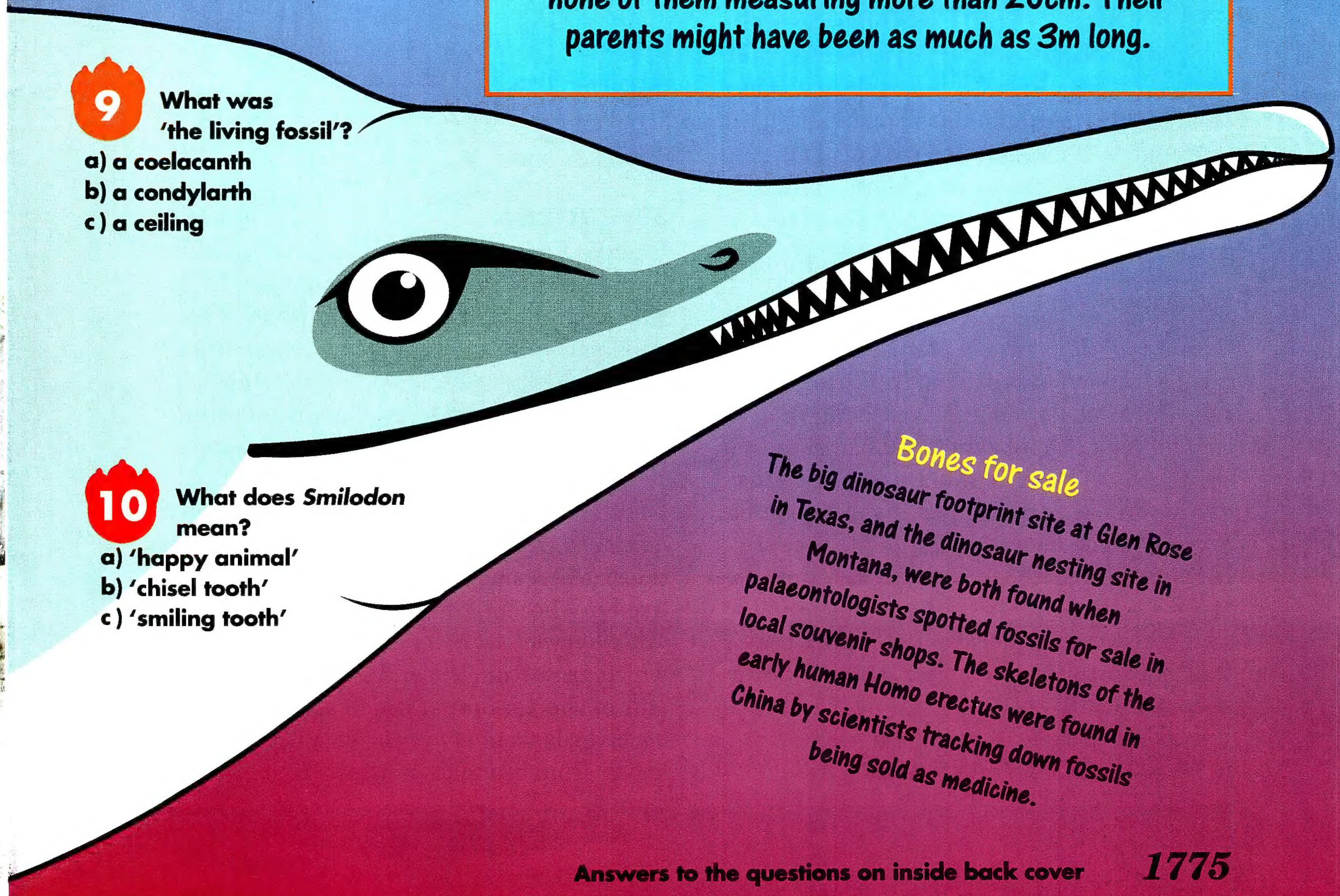
Dragging their tails behind them

Dinosaur footprints are common, but marks of tails dragging on the ground are not. The old idea was that dinosaur footprints were made underwater and that the tail floated above the bed so it didn't make any marks. Nowadays, experts think that dinosaurs kept their tails in the air for balance and did not drag them on the ground.

Small, but perfectly formed



This is a fossil of a baby Mussaurus from Argentina. Several skeletons were found in the same nest, none of them measuring more than 20cm. Their parents might have been as much as 3m long.



9 **What was 'the living fossil'?**

a) a coelacanth
b) a condylarth
c) a ceiling

10 **What does *Smilodon* mean?**

a) 'happy animal'
b) 'chisel tooth'
c) 'smiling tooth'

Bones for sale

The big dinosaur footprint site at Glen Rose in Texas, and the dinosaur nesting site in Montana, were both found when palaeontologists spotted fossils for sale in local souvenir shops. The skeletons of the early human Homo erectus were found in China by scientists tracking down fossils being sold as medicine.

Answers to the questions on inside back cover

SMILODON 2 MYA

Smilodon (smile-oh-don) was a sabre-toothed cat with long, deadly fangs. It attacked by biting and stabbing its victims with its massive teeth until the animals lost so much blood they were too weak to fight. It lived in North America in the Pleistocene Epoch and grew to be 2m long. *Smilodon* may have been a scavenger as well as a hunter, and certainly would have had to guard its kills from other scavengers. Sabre-toothed cats died out about 10,000 years ago when the big Ice-Age mammals that they hunted became extinct. *Smilodon* means 'chisel tooth'.

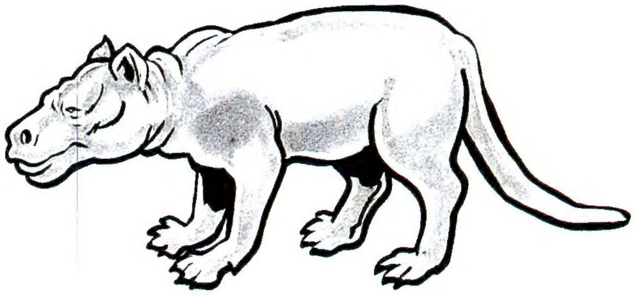
SORDES 145 MYA

Sordes (sor-dayz) was a pterosaur, which means 'winged lizard'. It lived during the Late Jurassic Period in Kazakhstan in central Asia. It had wings made of skin that stretched between its limbs and body. This extraordinary creature was given the name *Sordes*, which means 'hairy devil', because, from its fossils, it looked as if a layer of fluffy hair covered its body and the upper part of its legs. Some scientists think that this 'hair' was used to help *Sordes* fly or to keep it warm.

MYA = MILLION YEARS AGO

STHENURUS
2 MYA

A giant kangaroo, *Sthenurus* (sthen-uh-roos) lived in Pliocene and Pleistocene times in Australia. Almost three times taller than the kangaroo of today, this marsupial bounded along on enormous hind legs and browsed on leaves. *Sthenurus* had a short tail and a huge fourth toe on its long, narrow feet.



STYLINODON 45 MYA

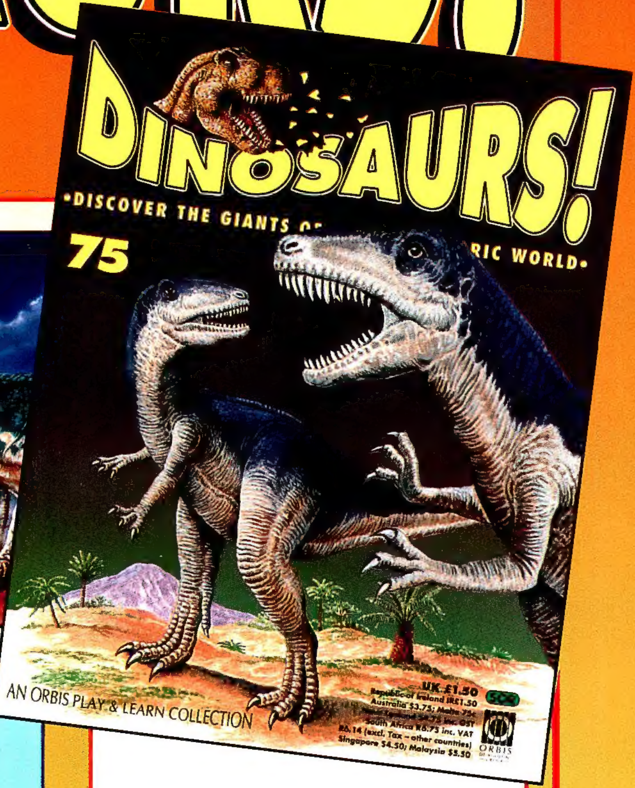
Pig-like *Stylinodon* (still-in-oh-don) lived in Late Eocene times in North America. It walked on four strong limbs supported by stubby toes. Its powerful claws were probably used to dig up roots, which it munched with pegged, rootless teeth. *Stylinodon* became extinct by the end of the Eocene Epoch.

SYNTHETOCERAS 15 MYA

Synthetoceras (sin-thet-oh-see-ras) was about the size of a small deer. This graceful animal lived in Miocene times in North America. Male *Synthetoceras* had a Y-shaped horn, which grew from the end of its snout, and a pair of shorter horns, which sloped backwards from above its eyes. It ripped leaves from branches with the tip of its jaws.

COMING IN PART 75 OF

DINOSAURS!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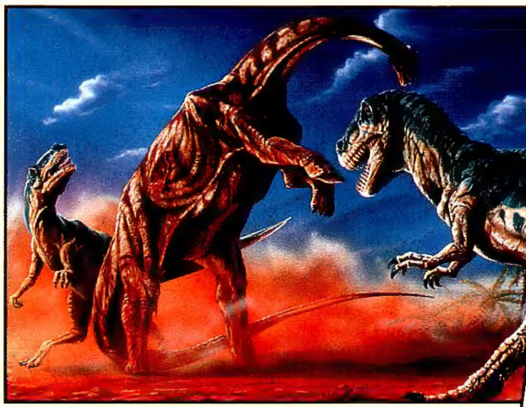

Take a walk along a Jurassic beach in TIME DETECTIVE. Trace the evolution of primates – our ancestors – in PREHISTORIC WORLD.

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HISTORY IN PICTURES
3-D GALLERY
GIANTS OF THE PAST

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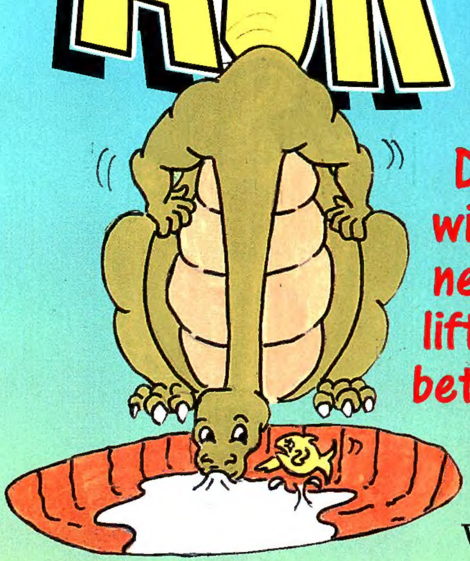
ANSWERS TO FACT FILE QUESTIONS: 1.b 2.a 3.c 4.a 5.b 6.c 7.b 8.c 9.a 10.b

ASK THE EXPERT

Dr David Norman of Cambridge University answers your dinosaur questions

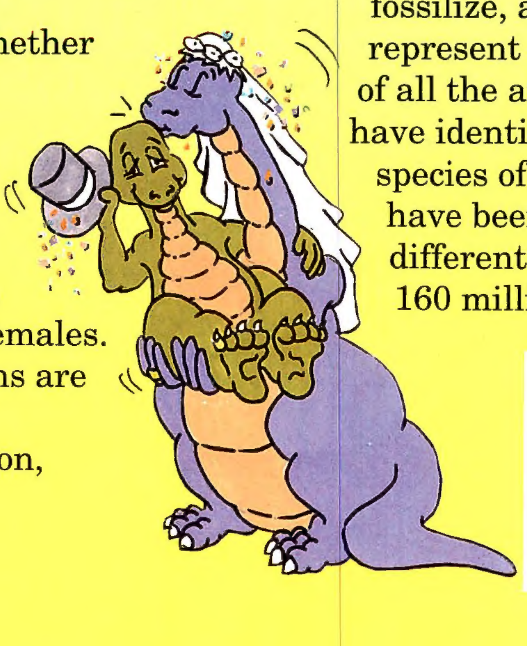


Did dinosaurs with long necks have to lift their heads between taking mouthfuls of water?

When animals drink, the water goes into the throat and then into the entrance to the oesophagus. The oesophagus is the muscular tube that leads to the stomach. Inside the oesophagus, the water starts an automatic swallowing reflex, which carries the water all the way to the stomach without the head being raised.

Were male and female dinosaurs different sizes?

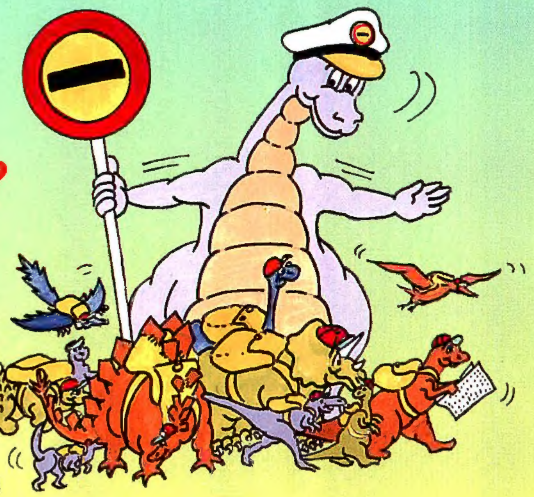
We don't know for certain whether male dinosaurs were larger than females, as is the case in most animal species. Experts cannot be absolutely sure which dinosaur skeletons belong to males and which belong to females. This is because the sex organs are made of soft tissue, which disappears during fossilization, removing all the evidence.



Horn is a very tough substance. Why is it never fossilized?

Although horn is quite tough, it is made from keratin, which rots much more quickly than bones. It is very rare for horns or claws to be preserved, but it is possible in the right conditions.

How many types of dinosaur were there?



We still have no definite idea how many types there were. Not all species fossilize, and the ones that do represent a very small percentage of all the animals that existed. We have identified only a few hundred species of dinosaur. There would have been tens of thousands of different dinosaurs during their 160 million-year reign.

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